ACADEMIC REGULATIONS
PROGRAM STRUCTURE
and
DETAILED SYLLABUS

Bachelor of Technology

(Electrical and Electronics Engineering)

(Effective for the students admitted from the Academic Year 2015-16)

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

ACADEMIC REGULATIONS

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

For all Undergraduate Programmes (B. Tech)
GR15 REGULATIONS

Gokaraju Rangaraju Institute of Engineering and Technology - 2015 Regulations (GR15 Regulations) are given hereunder. These regulations govern all the Undergraduate Programmes offered by various departments of Engineering with effect from the students admitted to the programmes from 2015-16 academic year.

1. **Programme Offered:** The Undergraduate programme offered by the department is B.Tech, a four-year regular programme in that discipline.

2. **Medium of Instruction:** The medium of instruction (including examinations and reports) is English.

3. **Admissions:** Admission into the B.Tech Programme in any discipline shall be made subject to the eligibility, qualifications and specialization prescribed by the State Government/University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in the common entrance examination conducted by the Government/University or on the basis of any other order of merit approved by the Government/University, subject to reservations as prescribed by the Government / University from time to time.

4. **Programme Pattern:**
   a) A student is introduced to "Choice Based Credit System (CBCS)" for which he/she has to register for the courses at the beginning of each semester as per the procedure.
   b) Each Academic year of study is divided into two semesters.
   c) Minimum number of instruction days in each semester is 90.
   d) The total credits for the Programme is 200. Typically each semester has 25 credits.
   e) Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA(Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
   f) A student has a choice of registering for credits from the courses offered in the programme ensuring the total credits in a semester are between 21 and 29.
   g) All the registered credits will be considered for the calculation of final CGPA.
   h) All courses are to be registered by a student in a semester as per the procedure at the beginning of the semester. All the courses are broadly classified as

S.no	Code	Area	% of credits in the Programme Min	Max
1	HS	Humanities and Social Sciences	5	10
2	BS	Basic Sciences	15	20
3	ES	Engineering Sciences	15	20
4	PC	Professional subjects – Core	30	40
5	PE	Professional Subjects – Elective	10	15
6	OE	Open Elective	05	10
7	PW	Project Work	10	15
8	MC	Mandatory Course*	02	06

*Credits/ Marks are not counted for grading / Pass percentage

5. **Award of B.Tech Degree:** A student will be declared eligible for the award of B. Tech Degree if he/she fulfills the following academic requirements:
   a) A student shall be declared eligible for the award of B.Tech degree, if he/she pursues the course of study and completes it successfully in not less than four academic years and not more than eight academic years.
   b) A student has to register for all the 200 credits and secure all credits.
   c) A student has to acquire a minimum of 5.00 SGPA in each semester for the award of B. Tech degree.
   d) A Student, who fails to fulfill all the academic requirements for the award of the degree within eight academic years from the date of admission, shall forfeit his/her seat in B.Tech course.
   e) The Degree of B.Tech shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, to the students who are admitted to the programme and fulfill all the requirements for the award of the degree.

6. **Attendance Requirements**
   a) A student shall be eligible to appear for the semester-end examinations if he/she puts in a minimum of 75% of attendance in aggregate in all the courses concerned in the semester.
   b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted. A committee headed by Dean (Academic Affairs) shall be the deciding authority for granting the condonation.
   c) Students who have been granted condonation shall pay a fee as decided by the Academic Council.
   d) Shortage of Attendance more than 10%(attendance less than 65% in aggregate) shall in no case be condoned.
   e) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end examinations of that semester. They may seek re-registration for that semester when offered next with the academic regulations of the batch into which he/she gets re-registered.

7. Paper Setting, Evaluation of Answer Scripts, Marks and Assessment

a) **Paper setting and evaluation** of the answer scripts shall be done as per the procedures laid down by the Academic Council from time to time.

b) **Distribution and Weightage of marks**

S.no	Components	Internal	External	Total
1	Theory	30	70	100
2	Practical	25	50	75
3	Engineering Graphics	30	70	100
4	Industry Oriented Mini Project	25	50	75
5	Comprehensive Viva	-	100	100
6	Seminar	-	100	100
7	Major Project	50	150	200

c) **Continuous Internal Evaluation and Semester End Examinations:**

The assessment of the student's performance in each course will be based on Continuous Internal Evaluation (CIE) and Semester-End Examination (SEE). The marks for each of the component of assessment are fixed as shown in the following Table.

Assessment Procedure :

S.No	Component of Assessment	Marks Allotted	Type of Assessment	Scheme of Examinations
1	Theory	30	Internal Exams & Continuous Evaluation	1) Two mid semester examinations shall be conducted for 20 marks each for duration of 2 hours. Average of the two mid exams shall be considered i) Subjective - 15 marks ii) Objective - 5 marks 2) Tutorials - 5 marks 3) Attendance - 5 marks
		70	Semester-end examination	The semester-end examination is for a duration of 3 hours

2	Practical	25	Internal Exams & Continuous Evaluation	1) Lab Internal :10 marks 2) Record : 5 marks 3) Continuous Assessment : 5 marks 4) Attendance : 5 marks
		50	Semester-end examination	The semester-end examination is for a duration of 3 hours.

d) **Industry Oriented Mini Project:** The Mini Project is to be taken up with relevance to Industry and is evaluated for 75 marks. Out of 75 marks, 25 marks are for internal evaluation and 50 marks are for external evaluation. The supervisor continuously assesses the students for 15 marks (Attendance – 5 marks, Continuous Assessment – 5 marks, Report – 5 marks). At the end of the semester, Mini Project shall be displayed in the road show at the department level for the benefit of all students and staff and the same is to be evaluated by Mini Project Review Committee for 10 marks. The mini project report shall be presented before Project Review committee in the presence of External Examiner and the same is evaluated for 50 marks. Mini Project Review Committee consists of HOD, Mini Project Coordinator and Supervisor.

e) **Comprehensive Viva:** The comprehensive viva shall be conducted by a Committee consisting of HOD and two senior faculty members of the department. The student shall be assessed for his/her understanding of various courses studied during the programme of study. The Viva-voce shall be evaluated for 100 marks.

f) **Seminar:** For the seminar, the student shall collect information on a specialized topic and prepare a technical report and present the same to a Committee consisting of HOD and two senior faculty and the seminar coordinator of the department. The student shall be assessed for his/her understanding of the topic, its application and its relation with various courses studied during the programme of study for100 marks.

g) **Major Project:** The project work is evaluated for 200 marks. Out of 200, 50 marks shall be for internal evaluation and 150 marks for the external evaluation. The supervisor assesses the student for 25 marks (Attendance – 5 marks, Continuous Assessment – 15 marks, Report – 5 marks). At the end of the semester, projects shall be displayed in the road show at the department level for the benefit of all students and staff and the same is to be evaluated by the Project Review Committee for 25 marks. The external evaluation for Project Work is a Viva-Voce Examination which is conducted by the Project Review Committee in the presence of external examiner and is evaluated for 150 marks, Project Review Committee consists of HOD, Project Coordinator and Supervisor.

h) **Engineering Graphics:**

- Two internal examinations, each is of 10 marks .The average of the two internal tests shall be considered for the award of marks.
- Submission of day to day work - 15 marks.
- Attendance - 5 marks.

8. **Recounting of Marks in the End Examination Answer Books:** A student can request for re-counting of his/her answer book on payment of a prescribed fee.

9. **Re-evaluation of the End Examination Answer Books:** A student can request for re-evaluation of his/her answer book on payment of a prescribed fee.

10. **a) Supplementary Examinations:** A student who failed to secure the required credits can appear for a supplementary examination, as per the schedule announced by the college.
    b) Improvement Examinations: A student who failed to secure SGPA of at least 5.00 in a semester can reappear for the external examination of the required courses of the semester for an improvement in SGPA, with the approval from HOD and faculty advisor.

11. **Malpractices in Examinations:** Disciplinary action shall be taken in case of malpractices during Mid/ End-examinations as per the rules framed by the Academic Council.

12. **Academic Requirements:**
    a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he / she secures not Less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end examination taken together.
    b) A student shall be promoted to the next semester only when he/she satisfies the requirements of all the previous semesters.
    c) A student shall be promoted from I year to II year if and only if he/she secures 25 credits from all the I year regular and supplementary examinations.
    d) A student shall be promoted from II year to III year if and only if he/she secures 45 credits up to and including II year I Semester or 60 credits upto and including II year II Semester from all regular and supplementary examinations, whether or not the candidate takes the examinations.
    e) A student shall be promoted from III year to IV year if and only if he/she secures 75 credits upto and including III year I Semester or 90 credits upto and including III year II Semester from all regular and supplementary examinations, whether or not the candidate takes the examinations.
    f) **Grade Points:** A 10- point grading system with corresponding letter grades and percentage of marks, as given below, is followed

Letter Grade	Grade Point	Percentage of Marks
O (Outstanding)	10	Marks>=80 and Marks <= 100
A+ (Excellent)	9	Marks>=70 and Marks < 80
A (Very Good)	8	Marks>=60 and Marks < 70
B+ (Good)	7	Marks>=55 and Marks < 60
B (Above Average)	6	Marks>=50 and Marks < 55
C (Average)	5	Marks>=45 and Marks < 50
P (Pass)	4	Marks>=40 andMarks < 45
F (Fail)	0	Marks < 40
Ab (Absent)	0	

Earning of Credit:

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-P. Letter grade 'F' in any Course implies failure of the student in that course and no credits earned.

Computation of SGPA and CGPA:

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) $S_k$the SGPA of k^{th} semester(1 to 8)is the ratio of sum of the product of the number of credits and grade points to the total creditsof all courses registered by a student, i.e.,

$$\mathbf{SGPA\ (S_k) = \sum_{i=1}^{n} (Ci * Gi) / \sum_{i=1}^{n} Ci}$$

Where C_i is the number of credits of the i course and $G_i$is the grade point scored by the student in the i^{th} course and n is the number of courses registered in that semester.

ii) The CGPA is calculated in the same manner taking into account all the courses m, registered by a student over all the semesters of a programme, i.e.,upto and inclusive of S_k, where $k \geq 2$.

$$\mathbf{CGPA = \sum_{i=1}^{m} (Ci * Gi) / \sum_{i=1}^{m} Ci}$$

iii) The SGPA and CGPA shall be rounded off to 2 decimal points.

13. Award of Class: After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes (the marks awarded are from the aggregate marks secured for the 200 credits):

	Class Awarded	CGPA Secured
13.1	First Class With Distinction	CGPA ≥ 8.00 with no F or below grade/ detention anytime during the programme
13.2	First Class	CGPA ≥ 8.00 with rest of the clauses of 13.1 not satisfied
13.3	First Class	CGPA ≥ 6.50and CGPA < 8.00
13.4	Second Class	CGPA ≥ 5.50 and CGPA < 6.50
13.5	Pass Class	CGPA ≥ 5.00 and CGPA < 5.50

14. **Withholding of Results:** If the student has not paid dues to the Institute/ University, or if any case of indiscipline is pending against the student, the result of the student (for that Semester) may be withheld and the student will not be allowed to go into the next semester. The award or issue of the degree may also be withheld in such cases.

15. **Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities:** Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities shall be considered only on case-to-case basis by the Academic Council of the Institute.

16. **Transitory Regulations:** Students who have discontinued or have been detained for want of attendance, or who have failed after having undergone the Degree Programme, may be considered eligible for readmission/re-registration to the same or equivalent subjects as and when they are offered.

17. **General Rules**

a) The academic regulations should be read as a whole for the purpose of any interpretation.
b) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.
c) In case of any error in the above rules and regulations, the decision of the Academic Council is final.
d) The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

Academic Regulations for B.Tech (Lateral Entry) under GR15

1. **All regulations as applicable for B.Tech Four year degree programme (Regular) will hold good for B.Tech (Lateral Entry Scheme) except for the following rules**
   a) Pursued programme of study for not less than three academic years and not more than six academic years.
   b) Registered for 150 credits and secured 150 credits. The marks obtained in all 150 credits shall be considered for the calculation of the final CGPA.
   c) Students who fail to fulfil all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech programme.

2. **Academic Requirements**
   a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he / she secures not less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end examination taken together.
   b) A student shall be promoted to the next semester only when he/she satisfies the requirements of the previous semester.
   c) A student shall be promoted from II year to III year if and only if he/she secures 25 credits up to and including II year II Semester from all regular and supplementary examinations, whether or not the candidate takes the examinations.
   d) A student shall be promoted from III year to IV year if and only if he/she secures 45 credits up to and including III year I Semester or 60 credits up to and including III year II Semester from all regular and supplementary examinations, whether or not the candidate takes the examinations.

3. **Award of Class:** After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes (the marks awarded are from the aggregate marks secured for the 150 credits):

	Class Awarded	CGPA Secured
3.1	First Class With Distinction	CGPA ≥ 8 with no F or below grade/ detention anytime during the programme
3.2	First Class	CGPA ≥ 8 with rest of the clauses of 3.1 not satisfied
3.3	First Class	CGPA ≥ 6.50 and CGPA < 8
3.4	Second Class	CGPA ≥ 5.50 and CGPA < 6.50
3.5	Pass Class	CGPA ≥5.00 and CGPA < 5.50

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech (EEE) PROGRAMME STRUCTURE

I B.Tech (EEE) **I Semester**

Group	Sub-Code	Subject	L	T	P	Credits	Hours	Int.	Ext.	Marks
BS	GR15A1001	Linear Algebra and Single Variable Calculus	2	1	-	3	4	30	70	100
BS	GR15A1002	Advanced Calculus	2	1	-	3	4	30	70	100
HS	GR15A1005	English	2	1	-	3	4	30	70	100
BS	GR15A1007	Engineering Physics	2	1	-	3	4	30	70	100
ES	GR15A1009	Computer Programming	2	1	-	3	4	30	70	100
ES	GR15A1018	Basic Electrical Engineering	3	1	-	4	5	30	70	100
ES	GR15A1025	Engineering Workshop	-	-	2	2	4	25	50	75
ES	GR15A1027	Computer Programming Lab	-	-	2	2	4	25	50	75
BS	GR15A1029	Engineering Physics Lab	-	-	2	2	4	25	50	75
		Total	**13**	**6**	**6**	**25**	**37**	**255**	**570**	**825**

I B.Tech (EEE) **II Semester**

Group	Sub-Code	Subject	L	T	P	Credits	Hours	Int.	Ext.	Marks
BS	GR15A1003	Transform Calculus and Fourier Series	2	1	-	3	4	30	70	100
BS	GR15A1004	Numerical Methods	2	1	-	3	4	30	70	100
ES	GR15A1019	Fundamentals of Electronics Engineering	3	1	-	4	5	30	70	100
BS	GR15A1008	Engineering Chemistry	2	1	-	3	4	30	70	100
ES	GR15A1023	Engineering Graphics	1	-	2	3	5	30	70	100
ES	GR15A1010	Data Structures	2	1	-	3	4	30	70	100
ES	GR15A1026	IT Workshop	-	-	2	2	4	25	50	75
BS	GR15A1030	Engineering Chemistry lab	-	-	2	2	4	25	50	75
HS	GR15A1024	Business Communication and Soft Skills	-	-	2	2	4	25	50	75
		Total	**12**	**5**	**8**	**25**	**38**	**255**	**570**	**825**

II B.Tech (EEE) **I Semester**

Group	Sub-Code	Subject	L	T	P	Credits	Hours	Int.	Ext.	Marks
HS	GR15A2058	Special Functions and Complex Variables	2	1	-	3	4	30	70	100
PC	GR15A2076	Computer Organization	3	1	-	4	5	30	70	100
PC	GR15A2034	Electromagnetic Fields	3	1	-	4	5	30	70	100
PC	GR15A2035	Network Theory	3	1	-	4	5	30	70	100
PC	GR15A2036	DC Machines & Transformers	3	1	-	4	5	30	70	100
PC	GR15A2037	DC Machines Lab	-	-	2	2	4	25	50	75
PC	GR15A2038	Electrical Networks Lab	-	-	2	2	4	25	50	75
PC	GR15A2039	Electrical Simulation Lab	-	-	2	2	4	25	50	75
		Total	**14**	**5**	**6**	**25**	**36**	**225**	**500**	**725**
MC	GR15A2001	Environmental Science	-	-	2	2	4	30	70	100

II B.Tech (EEE) **II Semester**

Group	Sub-Code	Subject	L	T	P	Credits	Hours	Int.	Ext.	Marks
HS	GR15A2104	Managerial Economics and Financial Analysis	2	1	-	3	4	30	70	100
PC	GR15A2040	Power Generation and Distribution	3	1	-	4	5	30	70	100
PC	GR15A2041	AC Machines	3	1	-	4	5	30	70	100
PC	GR15A2042	Control Systems	3	1	-	4	5	30	70	100
PC	GR15A2105	Principles of Digital Electronics	3	1	-	4	5	30	70	100
PC	GR15A2044	AC Machines Lab	-	-	2	2	4	25	50	75
PC	GR15A2045	Control Systems Lab	-	-	2	2	4	25	50	75
PC	GR15A2046	Analog and Digital Electronics Lab	-	-	2	2	4	25	50	75
		Total	**14**	**5**	**6**	**25**	**36**	**225**	**500**	**725**
MC	GR15A2002	Value Education and Ethics	-	-	2	2	4	30	70	100
MC	GR15A2106	Gender Sensitization Lab	-	-	2	2	4	25	50	75

SYLLABUS

I-Year

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

LINEAR ALGEBRA AND SINGLE VARIABLE CALCULUS

Course Code: GR15A1001 L:2 T:1 P:0 C:3

Prerequisites: Vector algebra, Matrix algebra and Pre-calculus

Course objectives: The objective of this course is to provide

- Introduce the ideas of linearity and linear systems, which lie at the core level of many engineering concepts
- Explore the extensions of differential calculus, which form the stepping stones to a broader subject called " approximation theory"
- Learn the skill of seeing a mathematical equation in many commonly occurring natural phenomena and acquire preliminary skills to predict their behavior
- Provide an over view of mean value theorems and its applications
- Discuss the significant applications of higher order differential equations.

Course Outcomes: At the end of the course, the student will be able to

- Recognize the concepts of matrix rank to analyze linear algebraic systems
- Compute eigen values and vectors for engineering applications
- Illustrate the concepts of Mean Value Theorems to Describe the Medical Imaging and Industrial Automation.
- Differentiate various differential equations using elementary techniques (Exact or linear constant coefficient equations)
- Demonstrate model and solve linear dynamical systems
- Apply concepts of higher order differential equations to solve typical problems in Electrical circuits.
- Identify the physical phenomena of Simple harmonic motion by concepts of Differential equations.

Unit-I

Linear Algebra and Matrix eigen value problem: Rank of a matrix,Consistency of a system of linear equations-Pseudo inverse of a matrix-Condition number of a matrix-Approximate solution of an over determined system of linear equations using the pseudo inverse-Solution of a system of homogeneous linear equations.

Vector norms, Linear dependence of vectors, Gram-Schmidt orthogonalization of vectors, Matrix norms. Determination of eigen values and eigen vectors of a square matrix-Properties of eigen values and eigen vectors of real and complex matrices.

Unit-II

Matrix factorization and Quadratic Forms: Diagonalization of a matrix- Orthogonal diagonalization of symmetric matrices-Computation of matrix powers- Computation of Singular value decomposition - QR factorization.

Quadratic forms-Definiteness of a quadratic form-Rank, index and signature of a quadratic form-Reduction of a quadratic form into a canonical form by Lagrange's method and by an orthogonal transformation.

Unit-III

Differential Calculus of functions of a single variable: Mean value theorems (Rolles', Lagrange's, Cauchy's, Taylor's and Maclaurin's theorems Geometrical Interpretation without proof) - Approximation of functions by Taylor's and Maclaurin's theorems-Series expansion of functions.

Unit-IV

Linear differential equations of the first order and their applications: Formation of ODE-Methods to solve first order LDE (exact, reducible to exact, linear and Bernoulli equations). Applications - Growth and decay models - Newton's law of cooling - Applications to electrical circuits (LR and RC circuits) - Geometrical applications - Orthogonal trajectories.

Unit-V

Linear differential equations of the higher order and applications: Equations with constant coefficients-Particular integrals for functions of the type e^{ax}, x^n, sinax, cos ax, $e^{ax}.V(x)$ Exponential shift - Method of variation of parameters.
Applications - Deflection of beams, Simple harmonic motion (simple pendulum, spring-mass systems) and RLC circuits.

Teaching Methodologies

1. Tutorial sheets uploaded in website
2. NPTEL video lectures
3. MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar- Narosa Publishing House
2. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications.

References Books

1. Introduction to Linear Algebra-Gilbert Strang
2. Schaum's outline series on Linear Algebra
3. GRIET reference manual

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED CALCULUS

Course Code: GR15A1002 L:2 T:1 P:0 C:3

Prerequisites: Analytical 2-D and 3-D geometry, differential and integral calculus

Course Objectives: The objective of this course is to provide

- Introduce the techniques of tracing a curve using its geometrical properties
- Visualize multivariable functions in the context of function optimization
- Learn the skill of performing integration in 2-D and 3-D and apply them to estimate Characteristics of vector fields
- Introduce the concepts of vector differential calculus
- Demonstrate the Vector Integral Theorem with physical Interpretation.

Course Outcomes: At the end of the course, the student will be able to

- Identify the techniques of curve tracing and geometry to precisely estimate areas and volumes
- Solve problems on function optimization with and without constraints
- Demonstrate the knowledge of multiple integrals in solving problems in vector fields
- classify the concepts of differential calculus with physical Interpretation
- Categorize the verification and evaluation of Vector integral theorems geometrically.
- Explain the real significance of applications of multiple integrals.
- Classify the concepts of application of Integration.

Unit-I

Differential Calculus of functions of several variables and Function Optimization: Partial differentiation - Hessian matrix-Total differentiation-Jacobians. Optimization of functions of several variables without constraints- Constrained optimization of functions of several variables with equality constraints-The Lagrange's multiplier method.

Unit-II

Curve tracing principles and Applications of integration: Preliminary treatment of curve tracing Cartesian, polar and parametric curves -Applications of the definite integral to evaluate arc lengths, surface areas and volumes generated by revolution of plane area.

Unit-III

Multiple integrals and applications: Evaluation of Double integrals in Cartesian and polar coordinates-Changing the order of integration- Change of variables - Evaluation of triple integrals in Cartesian, cylindrical and spherical coordinates. Application of multiple integrals to evaluate plane areas and volumes of solids.

Unit-IV

Vector Calculus: Vector differentiation in Cartesian coordinates-Gradient, Divergence and Curl and their physical interpretation-Directional derivatives-Angle between surfaces, Vector Identities, Irrotational fields and scalar potentials. Vector integration-Evaluation of line integrals-Work done by conservative fields-Surface integrals.

Unit-V

Vector Field theorems: Green's theorem in the Plane-Divergence theorem of Gauss-Stoke's theorem (Without Proofs).

Teaching Methodologies

1. Tutorial sheets uploaded in website
2. NPTEL video lectures
3. MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar Narosa Publishing House
2. Schaum's outline series on Vector Analysis
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications

Reference Books

1. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley
2. Calculus and Analytical Geometry-Thomas & Finney-Narosa
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGLISH

Course Code: GR15A1005 L:2 T:1 P:0 C:3

Prerequisites: Familiarity with basic language and communication skills.

Course objectives: The objective of this course is to provide

- Identify the importance to acquire Basic Language Skills in English.
- Relate the vocabulary, Grammar and Structures in English.
- Practice to analyze and express their ideas in the new context.
- Demonstrate the learnt public speaking skills in an enthusiastic manner.
- Integrate oral and written communication skills.

Course outcomes: At the end of the course, the student will be able to

- Read and comprehend a wide range of text and know the importance of lifelong learning.
- Improve English language proficiency with an emphasis on LSRW skills.
- Interpret academic subjects with better understanding.
- Express ideas fluently and appropriately in terms of various social and professional areas.
- Revamp English language skills to meet the corporate needs.
- Present themselves in various formal, social and professional situations.
- Improve literary sense through wide range of selections from various genres.

Unit-I

1. Chapter entitled Sir C.V. Raman: A Path breaker in the saga of Indian Science from "Enjoying Every day English", Published by Sangam Books, Hyderabad.
2. Chapter Entitled Mother Teresa from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

   Tutorial-1: Present a small biographical sketch of an inspiring personality **Tutorial-2:** Prepare an essay on "Charity begins at home."

Unit-II

Grammar & Vocabulary Development: Articles: Types of Articles and their usages; Tense and Aspect; Subject and Verb Agreement; Prepositions
Vocabulary Development: Synonyms and Antonyms; One-word substitutes; prefixes and suffixes; words often confused; idioms and phrases.
Speaking & Writing skills: Information transfer: verbal to graphical presentation and from graphical presentation to verbal. Public Speaking: Body Language, Presentation Skills and its Features.

Tutorial-3: Worksheet on the usage of Tenses, Articles and Prepositions

Tutorial-4: Exercises on vocabulary

Tutorial-5: Interpretation of data from different formats

Unit-III

1. Chapter Entitled The Connoisseur from "Enjoying Every day English", Published by Sangam Books, Hyderabad
2. Chapter Entitled Sam Pitroda from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur.

Tutorial-5: Story Analysis

Tutorial-6: Present a person who bears risk taking ability to solve the problems of people/society

Tutorial-7: Describe a strange event that occurred in your life

Unit-IV

1. Chapter Entitled Bubbling Well Road from "Enjoying Every day English", Published by Sangam Books, Hyderabad
2. Chapter Entitled Amartya Kumar Sen from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Tutorial-9: Oral Presentation on "Does the quality of Unity in Diversity helped us to acquaint easily with the trends of globalization?"

Tutorial-10: Develop an essay "The ways to impart moral and ethical values amongst the students."

Unit-V

1. Chapter entitled The Cuddalore Experience from "Enjoying Every day English", Published by Sangam Books, Hyderabad
2. Chapter Entitled Martin Luther King Jr. (I have a dream) from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Tutorial-11: Presentation on "The possible ways to educate students about Disaster Management."

Tutorial-12: Write or present "Is every present leader was a follower?"

Text Books

1. Enjoying Every day English by A. Rama Krishna Rao- Sangam Books
2. Inspiring Speeches and Lives by Dr.B.Yadava Raju, Dr.C.Muralikrishna, Maruthi Publications.

Reference Books

1. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
2. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw Hill.
3. Technical Communication, Meenakshi Raman, Sangeeta Sharma, Oxford higher Education.
4. English for Engineers Made Easy, Aeda Abidi, Ritu Chaudhry, CengageLearning.
5. Communicate or Collapse, Pushp Latha, Sanjay Kumar, PHI Learning Pvt.Ltd.
6. Communication Skills, Sanjay Kumar, Pushp Latha, Oxford Higher Education.
7. A Hand Book for Engineers, Dr. P. Eliah, BS Publications

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS

Course Code: GR15A1007 L:2 T:1 P:0 C:3

Prerequisites: Fundamentals in Physics and Mathematics.

Course Objectives: The objective of this course is to provide

- Describe the various bonds between the atoms, structures of crystals and their packing factors.
- Identify the behavior of Free electrons through various theories thereby know the classification of materials.
- Discuss the origin of Electrical and Magnetic properties of various materials.
- Interpret the properties of laser light and how it is used for communication in optical fiber networks.
- Explain the latest developments of Nano-technology.

Course Outcomes: At the end of the course, the student will be able to

- Identify and describe various bonds between the atoms and properties of various materials.
- Explain the behavior of free electrons and how they are responsible for exhibition of various properties.
- Classify various magnetic materials and apply knowledge gained in various fields.
- Differentiate different dielectric materials and its utilization.
- Analyze why Laser light is more powerful than normal light and its applications in various fields.
- Demonstrate the applications of optical fibers in communication.
- Extend the knowledge of characterization techniques to know the composition of Nano material.

Unit-I

Crystal Structures: Lattice points, Space lattice, Basis, Bravias lattice, unit cell and lattice parameters, Seven Crystal Systems with 14 Bravias lattices , Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Inter planar spacing of Cubic crystal system.

Defects in Crystals: Classification of defects, Point Defects: Vacancies, Substitution, Interstitial, Concentration of Vacancies, Frenkel and Schottky Defects, Edge and Screw Dislocations (Qualitative treatment), Burger's Vector.

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, Heisenberg's Uncertainty Principle, Schrodinger's Time Independent Wave Equation-Physical Significance of the wave Function-Particle in One Dimensional Potential Box.

Unit-II

Electron Theory of Metals: Classical free electron theory, Derivation of Ohm's law, Mean free path, Relaxation time and Drift velocity, Failures of Classical free electron theory, Quantum free electron theory, Fermi-Dirac distribution, Fermi energy, Failures of Quantum free electron theory.

Band Theory of Solids: Electron in a periodic potential, Bloch Theorem, Kronig-Penny Model(Qualitative Treatment), origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Effective mass of an Electron.

Semiconductor Physics: Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Fermi Level in Intrinsic and Extrinsic Semiconductors, Hall Effect and Applications.

Unit-III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Types of polarization: Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities (Electronic & Ionic) -Internal Fields in Solids, Clausius -Mosotti Equation, Piezo-electricity and Ferro- electricity.

Magnetic Properties: Magnetic Permeability, Magnetic Field Intensity, Magnetic Field Induction, Intensity of Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magnetron, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Hysteresis Curve on the basis of Domain Theory of Ferro Magnetism, Soft and Hard Magnetic Materials, Ferrites and their Applications.

Unit-IV

Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers.
Fiber Optics: Structure and Principle of Optical Fiber, Acceptance Angle , Numerical Aperture, Types of Optical Fibers (SMSI,MMSI,MMGI), Attenuation in Optical Fibers, Applications of Optical Fibers, Optical fiber Communication Link with block diagram.

Unit-V

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Bottom-up Fabrication: Sol-gel Process; Top-down Fabrication: Chemical Vapor Deposition, Physical, Chemical and Optical properties of Nano materials, Characterization (SEM, EDAX), Applications.

Teaching Methodologies

1. Power Point Presentation.
2. Assignments uploaded in website.

Text Books

1. **Engineering Physics:** P.K.Palanisamy, Scitech Publishers.
2. **Engineering Physics:** S.O.Pillai, New age International.
3. **Applied Physics:** T.Bhima Sankaram,G Prasad,BS Publications

Reference Books

1. **Solid State Physics:** Charles Kittel, Wiley & Sons (Asia) Pte Ltd.
2. **Fundamentals of physics:** Halliday, Resnick, Walker.
3. **Optical Electronics:** A.J Ghatak and K.Thyagarajan, Cambridge University Press.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER PROGRAMMING

Course Code: GR15A1009 L:2 T:1 P:0 C:3

Prerequisites: Knowledge of Mathematics required

Course Objectives: The objective of this course is to provide

- Basic computer system concepts.
- Design algorithms and draw flowcharts in a language independent manner.
- Concepts of C-programming language such as variables, operators, branching, looping, functions, arrays, pointers, structures and files.
- Convert recursive function to non-recursive function and vice versa
- Manipulate files.
- Examine the functions available in C-library.
- Interpret and debug the given program.

Course Outcomes: At the end of the course, the student will be able to

- Describe the basic computer system concepts.
- Recite algorithm, draw flowchart and write the program for a given scenario.
- Use the concepts of C-programming language and functions available in C-library to develop the programs.
- Experiment recursive and non-recursive functions
- Create and update files.
- Examine the static memory allocation and dynamic memory allocation of variables.
- Find the errors and trace the output of the program.

Unit-I

Introduction to Computers: Computer Hardware and Software, System Software, Programming Languages, Program Development steps, Algorithms, Flowcharts.

Introduction to C: History of C, Structure of C-Program, Keywords, Identifiers, Data types, Constants, Variables, Operators, Expressions, Precedence and order of evaluation, Type Conversion and Type Casting .

Unit-II

Managing I/O: Input-Output statements, Formatted I/O.
Decision making statements: if, if-else, if-else-if, nested if, switch
Iterative Statements: while, do- while, for**.**
Unconditional statements: break, continue, goto.

Unit-III

Arrays: Introduction, One-Dimensional arrays, Declaring and Initializing arrays, Multidimensional arrays

Strings: Introduction to Strings, String operations with and without using String Handling functions, Array of strings.

Unit-IV

Functions: Introduction, Function definition, Function declaration, Function Calls, Return values and their types, Categories of Functions, Nested Functions, Recursion, Storage Classes, Passing arrays to Functions.

Pointers: Pointers and addresses, Pointer expressions and Pointer arithmetic, Pointers and Functions, void pointer, Pointers and Arrays, Pointers and Strings, Array of pointers, Pointers to Pointers.

Dynamic memory allocation: malloc, calloc, realloc, free.

Unit-V

Structures: Basics of Structures, Nested Structures, Arrays of Structures, Arrays within Structures, Structures and Functions, Pointers and Structures, Self-referential Structures, Unions. **Files:** Introduction, Types of Files, File Access Functions, I/O on Files, Random Access to Files, Error Handling, Command Line Arguments.

Teaching Methodologies

1. White board and marker
2. Power point presentations

Text Books

1. The C Programming Language, BRIAN W. KERNIGHAN Dennis M.Ritchie, Second Edition, PHI.
2. Computer Programming and Data structures by E Balaguruswamy, published by Mc GrawHill.
3. Programming in C, Ashok N Kamthane, 2nd edition, Pearson Publication.

Reference Books

1. Programming in C, Pradip Dey, Manas Ghosh, Second Edition, Oxford University Press.
2. Let Us C, Yashwanth Kanetkar, 10th Edition, BPB Publications.
3. C& Data structures, P.Padmanabham, B.S. Publications.
4. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
5. Programming with problem solving, J.A.Jones & K.Harrow, Dreamtech Press.
6. Programming in C, Stephen G.Kochan, III Edition, Pearson Education.
7. Problem solving and program design in C, Jeri. R. Hanly, Elliot B.Koffman, Pearson Publication.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

BASIC ELECTRICAL ENGINEERING

Course Code: GR15A1018 L:3 T:1 P:0 C:4

Course Objectives: BEE (Basic Electric Engineering) is common to first year branches of UG Engineering(except BT). At the end of the course the student is expected to

- Introduction of the fundamentals of Electrical Engineering.
- Skill of Practical implementation of fundamental theory concepts.
- Solve problems in the fundamentals of electrical engineering.
- Understand the basic principles of general electrical machinery.
- Understand the applications of electrical engineering in real time.
- Visualization of common real time application of Electrical machinery.

Course Outcomes: At the end of the course, the Students will be able to

- Comprehend the basics of Electrical Engineering and practical implementation of Electrical fundamentals.
- Develop numerical solutions to fundamental electrical engineering.
- Make use of basic principles involved in electrical engineering concepts.
- Examine the methods to solve AC circuits.
- Analyse various circuits using network theorems.
- Know the basics of electric machines used in industries.
- Summarize the different applications of commonly used electric machinery.

Unit-I

Basic Laws: Ohm's law , Kirchhoff's voltage and current laws , Nodes-Branches and Loops , Series elements and Voltage Division , Parallel elements and Current Division , Star-Delta transformation, Independent sources and Dependent sources , Source transformation.

Unit-II

AC Fundamentals-I: Review of Complex Algebra , Sinusoids , Phasors , Phasor Relations of Circuit elements , Impedance and Admittance , Impedance Combinations , Series and Parallel combination of Inductors and Capacitors, Mesh analysis and Nodal Analysis.

Unit-III

AC Fundamentals-II: RMS and Average values, Form factor, Steady State Analysis of Series, Parallel and Series Parallel combinations of R, L,C with Sinusoidal excitation, Instantaneous power, Average power, Real power, Reactive power and Apparent power, concept of Power factor, Frequency.

Unit-IV

Resonance and Network Theorems: Resonance in Electric circuits: Analysis of Series and Parallel Resonance, Theorems: Superposition theorem, Thevinin's theorem, Norton's Theorem, Maximum Power Transfer Theorem, Reciprocity theorem.

Unit-V

Fundamentals Of Electrical Machines: Construction, Principle , Operation and Applications of –(i) DC Motor,(ii) Single phase Transformer (iii) Single phase Induction motor

Text Book

1. Fundamentals of Electric Circuits by Charles K.Alexander, Matthew N.O.Sadiku, Tata McGraw Hill Company.

Reference Books

1. Circuit Theory (Analysis and Synthesis) by A.Chakrabarti – Dhanpat Rai & Co
2. Basic Electrical Engineering by Nagasarkar, Oxford Publishers
3. Network Theory by Prof.B.N.Yoganarasimham.
4. Engineering Circuit Analysis by William H.Hayt.Jr, Jack E.Kemmerly and Steven M.Durbin by Tata McGraw Hill Company.
5. Electrical Engineering Fundamentals by Vincent Deltoro 6.Circuit Theory by Sudhakar and ShyamMohan

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING WORKSHOP

Course Code: GR15A1025 L:0 T:0 P:2 C:2

Prerequisites

Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

Course Objectives: The Objective of this course is to provide

- Introduction to general machining skills in the students
- Develop a skill in dignity of labour,precision,safety at work place,team working and development of right attitude
- To provide the students with hands on experience on different trades of engineering like Carpentry,Tinsmithy,Welding and Housewiring
- Production of simple models
- To perform different practical techniques

Course Outcomes: At the end of the course, students will be able to

- Design and model different prototypes in the Carpentry trade such as Cross lap joint, Dove tail joint
- Create various types in the trade of Fitting such as Straight fit,V-fit
- Construct various basic prototypes in the trade of tin smithy such as rectangular tray and open scoop etc.
- Analyze to make in the trade of Tin Smithy such as Rectangular tray and Open Cylinder
- Apply various House Wiring techniques such as Connecting one lamp with one switch,
- Develop various basic house wiring techniques such as two lamps with one switch, Connecting a Fluorescent tube, Series Wiring, Go down wiring
- Demonstrate to develop various basic prototypes in the trade of Welding such as Lap joint, Lap Tee joint, Butt joint and Corner joint

Unit-I

Carpentry Shop – 1:

1.1. Introduction to various types of wood such as Teak, Mango, Sheesham, etc. (Demonstration and their identification).

1.2. Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed. Job I Marking, sawing, planning and chiselling & their practice

1.3. Introduction to various types of wooden joints, their relative advantages and uses. Job II Preparation of half lap joint Job III Preparation of Mortise and Tenon Joint

1.4. Safety precautions in carpentry shop.

Unit-II

Fitting Shop – 2:

2.1. Introduction to fitting shop tools, common materials used in fitting shop.

2.2. Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade.

Job I Marking of job, use of marking tools and measuring instruments.

Job II Filing a dimensioned rectangular or square piece of an accuracy of + 0.5 mm

Job III Filing practice (production of flat surfaces). Checking by straight edge.

Job IV Making a cutout from a square piece of MS Flat using hand hacksaw such as T-fit and V-fit

2.3.Care and maintenance of measuring tools like callipers, steel rule, try square.

Unit-III

House wiring – 3:

3.1 Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses, PVC Conduits.

3.2 Study of electrical safety measures and demonstration about use of protective devices such as fuses, and relays including earthing.

JobI Identification of phase, neutral and earth of domestic appliances and their connection to two pin/three pin plugs.

JobII Preparation of a house wiring circuit on wooden board using fuse, switches, socket, holder, ceiling rose etc. in PVC conduit and PVC casing and capping wiring system.

Job III Two lamps in series and parallel connection with one way switch

JobIV Two lamps in series and one lamp in parallel connection with one way switch.

Job V Stair case lamp connection with two way switch.

Unit-IV

Tin- smithy – 4:

4.1 Introduction to tin -smithy shop, use of hand tools and accessories e.g. different types of hammers, hard and soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection of material and specifications.

4.2 Introduction and demonstration of hand tools used in tin -smithy shop.

4.3 Introduction and demonstration of various raw materials used in sheet metal shop e.g. M.S. sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheets etc.

corrugated sheet, aluminium sheets etc.

corrugated sheet, aluminium sheets etc.

4.4. Preparation of a rectangle tray and open scoop/ funnel.

Reference Books

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary. Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd.
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd.,New Delhi
5. Workshop Technology by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi.
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS LAB

Course Code: GR15A1029 L:0 T:0 P:2 C:2

Prerequisites: Fundamentals of Physics and Mathematics.

Course objectives: The objective of this course is to provide

- Record and tabulate physical quantities like resistance, capacitance, a.c voltage and frequency by using digital multimeter and CRO.
- Classify the behavior and characteristics of dielectric and magnetic materials for its optimum utilization.
- Apply the theoretical concepts of optical fibers in practical applications.
- Analyze the behavior of semiconductors in various aspects.
- Revise the basic properties of light like interference, diffraction through hands on experience.

Course outcomes: At the end of the course, the student will be able to

- Identify the usage of CRO, digital multi meter to record various physical quantities.
- Distinguish the characteristics and behavior of dielectric materials in a practical manner.
- Calculate losses in optical fiber and interpret them to the optical communication systems.
- Quantify the type of semiconductor and measurement of energy gap in a semiconductor.
- Investigate the properties of light like interference and diffraction through experimentation.
- Examine the behavior of magnetic materials with the help of graph.
- Analyze the characteristics of light emitting diodes for their optimum utilization.

List of Experiments

` 1. Determine the energy gap of a given semiconductor.
2. Calculate the energy loss in a given Ferro magnetic material by plotting B-H curve.
3. Calculate the Numerical Aperture of a given optical fiber.
4. Determine the Dielectric constant and Curie temperature of PZT material.
5. Calculate the Acceptance angle of a given optical fiber.
6. Draw V-I & L-I Characteristics of LASER diode.
7. Determine the bending losses in a given optical fibers.

8. Determine the Air-gap losses in a given optical fibers.
9. Determine the Hall Coefficient in Ge semiconductor by using Hall Experimental setup.
10. Determine the carrier concentration, mobility of charge carrier in Ge semiconductor.
11. Measure Ac voltage and frequency through CRO.
12. Measure Resistance and Capacitance by using digital multimeter.
13. Diffraction Grating.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER PROGRAMMING LAB

Course Code: GR15A1027 L:0 T:0 P:2 C:2

Prerequisite: Basic operations of computer and knowledge of mathematics

Course Objectives: The objective of this course is to provide

- The fundamentals of C programming language and analyze the given problem.
- Interpret, analyze and write the program for a given scenario.
- Exemplify static and dynamic memory allocation.
- Examine the functions available in C-library.
- Write a program in recursive and non-recursive manner
- Manipulate files.
- The concepts of searching and sorting algorithms for solving real time problems.

Course Outcomes: At the end of the course, the Student will be able to

- Use the programming concepts and c-library for writing the programs.
- Analyze and debug the given program.
- Develop an efficient program.
- Differentiate static and dynamic memory allocation.
- Compare the recursive and non-recursive programming approaches
- Create and update files
- Apply searching and sorting techniques for real time scenario.

Task- I

a) The heights of three students are 165, 148, 154 cm. respectively. Write a C program to sort the heights of the students in descending order.

b) Write a C program to find the roots of a quadratic equation using if-else.

c) The program should request the user to input two numbers and display one of the following as per the desire of user.

(a) Sum of numbers

(b) Difference of numbers

(c) Product of the numbers

(d) Division of the numbers.

Write a C program using switch statement to accomplish the above task.

d) In a mathematical number sequence let the first and second term in the Sequence are 0 and 1. Subsequent terms are formed by adding the preceding terms in the sequence.

Write a C program to generate the first 10 terms of the sequence.

Task-II

a) Write a C program to construct pyramid of numbers.

b) The reliability of an electronic component is given by reliability $r=e^{-\lambda t}$ where λ is the component failure rate per hour and t is the time of operation in hours. Determine the reliability at various operating times from 0 to 3000 hours by plotting a graph using a C program. The failure rate λ is 0.001. Plot the graph with a special symbol.

c) Write a C program to accept the date of birth and the current date to find the age of the person . The output should specify the age of a person in terms of number of years, months and days.

Task- III

a) Write a C program to calculate the following Sum: $Sum=1-x^2/2!+x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

b) For a certain electrical circuit with an induction (L) and Resistance (R) , the damped natural frequency is given by $f=\sqrt{(1/LC - R^2/4C^2)}$. Write a C program to calculate the frequency for different values of C starting from 0.01 to 0.1.

c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Task - IV

a) Write a C program to find both the largest and smallest number in a list of integers.

b) Write a C Program to search whether a given number is present in set of integers

c) Write a C Program to sort a given list of integers.

Task - V

a) Write a C program to count the lines, words and characters in a given text.

b) Write a C program to sort the names of 5 students in the alphabetical order.
Ex: Rita, Sneha, Priti, Briya, kitti as Briya , Kitti, Priti, Rita, Sneha

c) Write a C program to print all the rotations of a given string.
Ex: Rotations of the string "NEWS" are NEWS EWSN WSNE SNEW

Task - VI

a) Write a C program to perform the following operations:
i) To insert a sub-string in a given main string at a given position.
ii) To delete n Characters from a given position in a given string.

B) Write a C program to determine if the given string is a palindrome or not?

Task - VII

Write a C program that uses functions to perform the following:
i) Transpose of a matrix
ii) Addition of Two Matrices
iii) Multiplication of Two Matrices

Task - VIII

Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.
ii) To print the Fibonacci sequence
iii)To find the GCD (greatest common divisor) of two given integers.

Task- IX

a) Using pointers, write a function that receives a character string and a character as argument and deletes all occurrences of this character in the string.
b) Write a function using pointer parameter that compares two integer arrays to see whether they are identical. The function returns 1 if they are identical, 0 otherwise.

Task -X

Write a C program that uses functions to perform the following operations on two complex numbers

i) Addition
ii) Subtraction
iii) Multiplication
iv) Division
(Note: represent complex number using a structure.)

Task-XI

a) Write a c program which accepts employee details like (outer structure : name, employid, salary and (inner structure : area, street number, houseno)).Display the employee names and id belonging to a particular area.
b) Let us suppose that a hotel consists of name, address, average room charge and number of rooms. Then write a function to print out hotels with room charges less than a given value.(structures and functions)

Task - XII

a) Write a C Program to display the contents of a file.
b) Write a C Program for merging of two files into a single file.
c) Write a C Program to append data into a file.

Task - XIII

a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
(Note : The file name and n are specified on the command line.)

Task-XIV

a) Write a C program to develop Tic Tac Toe game
b) Write a C program to solve Towers of Hanoi

Text Books

1. Programming in C, Ashok N Kamthane, 2nd edition, Pearson Publication.
2. The C Programming Language, BRIANW. KERNIGHAN Dennis M.Ritchie, Second Edition, PHI.
3. Computer Programming and Data structures by E Balaguruswamy, published by Mc GrawHill.

Reference Books

1. Programming in C, Pradip Dey, Manas Ghosh, Second Edition, Oxford University Press.
2. Let Us C, Yashwanth Kanetkar, 10th Edition, BPB Publications.
3. C& Data structures, P.Padmanabham, B.S. Publications.
4. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
5. Programming with problem solving, J.A.Jones & K.Harrow, Dreamtech Press.
6. Programming in C, Stephen G.Kochan, III Edition, Pearson Education.
7. Problem solving and program design in C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Publication.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

TRANSFORM CALCULUS AND FOURIER SERIES

Course Code: GR15A1003 L:2 T:1 P:0 C:3

Prerequisites: Differential and integral calculus, multiple integrals and linear differential equations

Course Objectives: The objective of this course is to provide

- Introduce improper integrals and specially to Beta and Gamma Functions
- Introduce the idea of domain transformation for easy problem solving
- Learn the skill of decomposing a periodic and non-periodic function in to fundamental Components using Fourier series and Fourier transform
- Introduce PDE and acquire the skill of finding analytical solutions of such equations
- Identify the real time problem and formulate the mathematical model.

Course Outcomes: At the end of the course, the student will be able to

- Calculate definite integral values using Beta and Gamma Functions
- Develop the skill of evaluating Laplace and inverse Laplace transform to solve linear systems under initial and boundary conditions
- Illustrate the concepts of Laplace Transform to find the solutions of physical problems such as Electrical circuits.
- Interpret the Fourier series and Fourier transform in the context of signals and systems.
- Solve difference equations by Z-Transform.
- Formulate Partial differential equations by eliminating arbitrary functions and arbitrary constants.
- Determine the solution of Boundary value problems (PDE) by Fourier Transform Method.

Unit-I

Improper Integrals and Beta, Gamma Functions: Beta and Gamma functions – Their properties – Evaluation of improper integrals in terms of Beta and Gamma functions.

Unit-II

Laplace Transform: Definition and existence of the Laplace Transform-Elementary functions-Properties of the Laplace transform-Convolution integral - Convolution theorem-Heaviside's unit step-function-Dirac delta function. The inverse Laplace transform-Properties-Method of partial fractions- Heaviside's inversion formula-Inversion by convolution theorem. Application of the Laplace transform to solve initial value problems and boundary value problems in ODE. Solution of a system of linear differential equations-Solution of problems in electrical circuits by Laplace transforms method.

Unit-III

Z-Transform and Fourier series: Definition-Z transform of elementary sequences-Properties-The inverse Z Transform, Application of Z transform to solve difference equations Definition of orthogonal functions-The concept of Weight function-Fourier series of periodic functions-Fourier expansion of periodic functions-Half range Fourier series expansions.

Unit-IV

Fourier Transform: Exponential Fourier series-The continuous one dimensional Fourier transform-Properties-Convolution-Parseval's identity- Fourier Sine and Cosine transforms.

Unit-V

Partial differential equations: Formation of PDE-Solution of Lagrange's linear equations-Method of separation of variables to solve IBVP like 1-D heat, 1-D wave and BVP like 2-D Laplace's equations. Application of Fourier transform to the solution of partial differential equations.

Teaching Methodologies

1. Tutorial sheets uploaded in website
2. NPTEL video lectures
3. MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R. K. Jain and S. R. K. Iyengar Narosa Publishing House.
2. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley
3. Schaum's outline series on Laplace transforms

Reference Books

1. Higher Engineering Mathematics: B. S. Grewal-Khanna Publications
2. Higher Engineering Mathematics: C. Das Chawla-Asian Publishers
3. GRIET reference manual

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

NUMERICAL METHODS

Course Code: GR15A1004 L:2 T:1 P:0 C:3

Prerequisites: Elementary calculus, Partial differentiation, Geometry and ordinary differential equations.

Course Objectives: The objective of this course is to provide

- Explain the distinction between analytical and approximate solutions arising in mathematics
- Acquire skills that equip us to approximate a hidden function using data
- Learn methods that provides solutions to problems hitherto unsolvable due to their complex Nature.
- Create ability to model, solve and interpreted the Engg Problem.
- Introduce the various applications of interpolation in Science and Engg.

Course Outcomes: At the end of the course, the student will be able to

- Develop the skill of determining approximate solutions to problems having no analytical Solutions in different contexts
- Solve problems related to cubic spline fitting and approximation of functions using B-splines and least squares
- Develop the skill of finding approximate solutions to problems arising in linear differential Equations
- Identify how the numerical methods play a vital role in many areas in engineering for example Dynamics, elasticity, heat transfer, electromagnetic theory and quantum mechanics.
- Interpret the mathematical results in physical or other terms to see what it practically means and implies.
- Explain the concept of interpolation is useful in predicting future out comes base on the present knowledge.
- Solve the model by selecting and applying a suitable mathematical method.

Unit-I

Root finding techniques and Numerical solution of linear algebraic systems: Bisection method-Regula Falsi- Fixed point iteration method-Newton Raphson method - Rate of convergence of the above methods (without proof). LU decomposition method-Cholesky's method-Jacobi and Gauss Seidel iteration methods- Convergence of iterative methods (without proof).

Unit-II

Interpolation and Cubic Splines: Finite differences - Forward, backward and central differences, Relationship between operators- Interpolation with uniform data**-**Newton's forward and backward difference interpolation formulas- Gauss forward, Gauss backward and Stirling's central interpolation formulas- Lagrange and Newton's divided difference interpolation formulas for non-uniform data- Cubic spline interpolation.

Unit-III

Curve fitting and B-spline approximation: Method of least squares- Fitting a straight line, and second degree parabola, exponential and power curves to data-Approximation of functions by B-Splines (Linear and Quadratic cases only).

Unit-IV

Numerical differentiation and numerical integration: Numerical differentiation using the Newton's forward, backward and central difference formulas-Numerical integration by Trapezoidal rule, Simpson's 1/3rd and 3/8th rules-Gauss-Legendre one point, two point and three point rules.

Unit-V

Numerical solution of initial and boundary value problems in ODE: Initial Value Problems: Picard's method of successive approximation, Solution by Taylor series method, Euler method, Runge-Kutta methods of second and fourth orders. Predictor-corrector methods, Combinations of first and second order P-C methods. Boundary Value Problems in ODE: Finite difference methods for solving second order linear ODE.

Teaching Methodologies

1. Tutorial sheets uploaded in website
2. NPTEL video lectures
3. MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar- Narosa Publishing House.
2. Advanced Engineering Mathematics: Erwin Kreyszig- Wiley.
3. Introductory methods of Numerical Analysis (5th edition)-S.S.Sastry- PHI.

Reference Books

1. Applied Numerical Methods using MATLAB- Yang, Cao, Chung & Morris – Wiley Interscience
2. Numerical methods in Engineering with MATLAB-Jaan Kiusalaas -Cambridge University Press.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

FUNDAMENTALS OF ELECTRONICS AND ENGINEERING

Course Code: GR15A1019 L:3 T:1 P:0 C:4

Prerequisites

- Fundamentals of Modern Physics
- Fundamentals of Electrical Networks

Course Objectives: The Objective of this course is to provide

- Define the semiconducting device constructing techniques
- Describe the diode forward and reverse bias characteristics
- Generalize the mathematical equations in design of transistor amplifier circuit design
- Analyze the mechanism of flow of current through the p-n junction and relating this phenomena to the characteristics and operation of the diodes, bipolar and uni polar transistors.
- Explain the principles of the regulated power supply, Zener diodes and regulation.
- Compare the concept of biasing techniques in BJT, FET and MOSFET so as to able to analyze advanced electronic circuits.

Course Outcomes: At the end of the course, students will be able to

- Comprehend the fundamentals of construction of the semiconducting materials, fabrication of elements working principles and operation of semiconductors.
- Analyze the concept with the working principles of forward and reverse bias characteristics.
- Know the basic skills in design and analysis of the filters circuits, biasing circuits
- Discriminate the principle, construction and operation BJTs, FETs and MOSFETs
- Interpret the different techniques for FET and MOSFET circuit designs
- Interpolate the performance and analysis-volt amp characteristics of a BJT and FET amplifiers.
- Analyze the small signal low frequency Transistor amplifiers using h-parameters.

Unit-I

Semiconductors and pn Junction Diode: Semiconductor Physics: n and p type semiconductors, Mass Action Law, Continuity Equation, Hall Effect, Fermi level in intrinsic and extrinsic semiconductors, Open- circuited p-n junction, Energy band diagram of PN diode, forward bias and reverse bias, Current components in p-n diode, Law of junction, Diode equation, Volt-ampere characteristics of p-n diode, Temperature dependence of V-I characteristic, Transition and Diffusion capacitances, Breakdown Mechanisms in Semiconductor Diodes (Avalanche and Zener breakdown), Zener diode characteristics,

Unit-II

Diode Applications, Special Diodes: Half wave rectifier, ripple factor, full wave rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter, Π-section filter, and comparison of various filter circuits in terms of ripple factors, Simple circuit of a regulator using zener diode, Series and Shunt voltage regulators
Special Diodes: Characteristics of Tunnel Diode, Varactor Diode, LED, LCD.

Unit-III

Bipolar Junction Transistor: Junction transistor, Transistor current components, Transistor as an amplifier, Transistor construction, Detailed study of currents in a transistor, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha and Beta and Gamma, typical transistor junction voltage values,

Junction Field Effect Transistors (JFET): JFET characteristics (n and p channels), Small signal model of JFET, MOSFET characteristics (Enhancement and depletion mode), Introduction to SCR and UJT.

Unit-IV

Biasing and stabilization : BJT biasing, DC equivalent model, criteria for fixing operating point, Fixed bias, Collector to base bias, Self bias techniques for stabilization, Stabilization factors, Compensation techniques, Compensation against variation in VBE and Ico, Thermal run away, Thermal stability.

Unit-V

Amplifiers: Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of Ai, Ri, Av, Ro.

Teaching Methodologies

- Power Point presentations
- Tutorial Sheets
- Assignments
- Lab experiments with Multisim software

Text Books

1. David A. Bell; Electronic Devices and Circuits, Oxford University Press, 5th edition, 2008.
2. R.L. Boylestad and Louis Nashelsky; Electronic Devices and Circuits, Pearson/Prentice Hall, 9th Edition, 2006.

Reference Books

1. T.F. Bogart Jr J.S.Beasley and G.Rico; Electronic Devices and Circuits – Pearson Education, 6th edition, 2004.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY

Course Code: GR15A1008 L:2 T:1 P:0 C:3

Prerequisites: Fundamentals in Engineering Chemistry Theory Course

Course Objectives: The objective of this course is to provide

- Explain the chemistry of water analysis essential for the functioning of certain core industries.
- Demonstrate how the chemistry of batteries and fuel cells provide energy vital for devices.
- Introduce a variety of engineering materials used in modern technology including
- Semiconductors, conducting polymers, liquid crystals, etc., to relate the molecular and crystal structure and properties to their engineering applications.
- Illustrate materials processing methods for industrial production of plastics, rubbers, silicon

Course Outcomes: At the end of the course, the student will be able to

- Analyse water for the industry required specifications.
- Understand the fundamental principles of electrochemistry for energy production and corrosion prevention.
- Know the origin of different types of engineering materials used in modern technology.
- Design new materials for novel applications.
- Develop the skills required for synthesis and analysis of materials.
- Relate the structure of materials to their properties and applications.
- Understand the processing of fossil fuels for the effective utilization of chemical energy
- Know the necessity of sustainable, environmentally-friendly energy sources like solar energy.

Unit-I

Water Technology: Sources of natural water, impurities, hardness: causes, types, expression, units, estimation of hardness of water using complexometric titration method, problems on hardness, Boiler feed water, boiler troubles(scale, sludge, carry over, Caustic Embrittlement, Boiler Corrosion). Internal treatment methods(carbonate, phosphate, calgon), Softening of water – Lime Soda, Ion- Exchange process. Alkalinity of water and its determination, Potable water- its characteristics and steps involved in Municipal Water Treatment, Chlorination-Break Point Chlorination, sterilization by ozonation. Desalination of Brackish water - Reverse Osmosis. Waste water-types of effluents, domestic and industrial effluents(an overview)

Unit-II

Electrochemistry & Corrosion: Concept of Conductances-specific, equivalent, molar conductances and their inter relationships applications of conductance-conductometric titrations-(Strong acid Vs Strong Base and Weak Acid Vs Strong Base). EMF of a cell, Electrode- Single Electrode Potential, Standard Electrode potential, Electro chemical series and its applications, Electrochemical Cells-types, Galvanic cell: cell representation, Cell reactions, Cell EMF, Electrolytic cells, Concentration cell. Batteries-types Lithium Cell(Li-thionyl Chloride), Secondary cells: Pb-PbO_2 cell, Fuel cells: H_2-O_2 fuel cells and their applications.

Causes and effects of corrosion-types of corrosion- chemical (Dry) corrosion-types and their mechanism, Electrochemical (Wet) corrosion and its mechanism, factors affecting the rate of corrosion – nature of metal and nature of environment. Corrosion Control Methods-Cathodic Protection: Sacrificial Anodic, Impressed Current Cathodic protection. Metallic Coatings –Anodic and Cathodic coatings, Methods of application of metallic coatings- Hot Dipping method(Galvanisation), Cementation(Sheradising), Electroplating(Cu coating), Organic Coatings: Paints – its constituents and their functions.

Unit-III

Engineering Materials I: Cement-types-portland cement –composition, Setting & Hardening of Portland cement. Ceramics-types-ceramic products - whitewares, Stonewares, properties and applications of ceramics. Refractories-classification,properties(refractoriness,RUL,thermal spalling, thermal conductivity) and their application.

Lubricants: Classification with examples, mechanisms of lubrication (thick film, thin film, extreme pressure), properties of lubricants- viscosity, flash point, fire point, cloud point, pour point (Definition and significance).

Unit-IV

Engineering Materials II: Electronic materials : Semiconductors, Preparation of Pure Ge and Si by Zone Refining, Czochralski Crystal Pulling, Doping Techniques-Epitaxy, Diffusion & ion implantation.

Polymer Materials: Monomer, polymer, types of polymerization-addition and condensation, Plastics-Thermoplastic resins, Thermo set resins. Compounding & fabrication of plastics (compression & Injection moulding), Preparation, Properties, Engineering applications of Hi Density Poly Ethylene(HDPE), Poly Vinyl Chloride(PVC), Bakelite & Nylon 6,6. Liquid Crystal Polymers and their applications, Organic Light Emmiting Diodes (an Overview). Biodegradable polymers-their advantages and their applications. Elastomers – preparation, properties and applications of Butyl rubber, Thiokol rubber, Styrene-Butadiene Rubber. Conducting Polymers-classification with examples-mechanism of conduction in trans poly acetylene and their applications.

Unit-V

Energy sources: Fossil Fuels: Coal –types, analysis of coal- proximate and ultimate analysis and their significance, Calorific value of fuel – HCV, LCV, Determination of Calorific Value using BOMB calorimeter, Theoretical calculation of Calorific Value by Dulong's formula, Numerical Problems. Petroleum-its composition-synthetic petrol – Bergius and Fischer Tropsch's process method , cracking (Definition) and its significance, knocking and its mechanism in Internal Combustion engines, Octane Rating of Gasoline, Composition, and applications of natural gas, LPG, CNG. Bio-fuels: preparation of Bio-diesel by transesterification method, advantages of Bio-fuel.

Teaching Methodologies

1. White Board with marker, OHP & Power Point Presentation
2. Conducting quizzes,
3. Conducting Experiments
4. Assignment uploaded in website.

Text Books

1. A text book of engineering chemistry by PC Jain and Monica Jain, Dhanpat Rai publishing company.

Reference Books

1. A text book of engineering chemistry by SS Dara and SS Umre, S Chand publications.
2. A text book of engineering chemistry by Dr Y Bharathi kumari and Dr Ch Jyothsna, VGS publications.
3. A text book of engineering chemistry by R.P.Mani, K.N.Mishra, B.Rama Devi, V.R.Reddy, cengage learning publications

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING GRAPHICS

Course Code: GR15A1023 L:1 T:0 P:2 C:3

Prerequisites: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability.

Course Objectives: The objective of this course is to provide the student with

- To distinguish and differentiate the importance of engineering drawing.
- The course of study elevates the interpretation level of manuscripts into engineering drawing.
- Distinguish the basic principles and different steps involved in principle of planes of projections.
- By Interpreting the basic principles, can focus on cause to extend and relate the information of objects.
- Visualize the difference views of a given object through Orthographic and isometric projections

Course Outcomes: At the end of the course, the student will be able to

- Demonstrate different types of lines, the use of different types of pencils and drafter to represent
- Illustrate the basic drawing techniques, conic sections, cycloid curves, involutes and engineering
- Explain the basic concept of principle of planes of projections in front view and top view.
- Make use of orthographic projections of points, lines , planes and solids
- Analyze the structure which was hypostatically designed ex: development of surfaces, section of
- Explain the logic to convert pictorial vies to orthographic projections and orthographic projections to
- Evaluate conversions of isometric views to orthographic views helps in inventing new machinery.

Unit-I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their Significance Drawing Instruments and their Use Conventions in Drawing Lettering BIS Conventions. Curves used in Engineering Practice & their Constructions: a) Conic Sections, b) Cycloid, Epicycloid and Hypocycloid, c) Involutes.

SCALES: Different types of scales. Plain Scale, Diagonal Scale & Vernier Scale

Unit-II

ORTHOGRAPHIC PROJECTIONS: Principles of Orthographic Projections Conventions First and Third Angle Projections. Projections of Points and Lines inclined to both planes, True lengths, traces.

Unit -III

PROJECTIONS OF PLANES: Planes parallel, perpendicular and inclined to one of the reference planes. Plane inclined to both the reference planes.

PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to both planes.

Unit-IV

SECTIONS OF SOLIDS: Types of section planes, Section by a plane perpendicular to V.P., Section by a plane perpendicular to H.P.

DEVELOPMENT OF SURFACES: Development of Surfaces of Right Regular Solids Prisms, Cylinder, Pyramid, Cone and their parts.

Unit-V

ISOMETRIC PROJECTIONS: Principles of Isometric Projection Isometric Scale Isometric Views Conventions Isometric Views of Lines, Plane Figures, Simple and Compound Solids Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic Views Conventions.

Teaching Methodology

Power point Presentations, Working models, white board & marker

Text Books

1. Engineering Drawing, N.D. Bhat / Charotar

Reference Books

1. Engineering Drawing and Graphics, Venugopal / New age.
2. Engineering Drawing- Johle/Tata Macgraw Hill.
3. Engineering Drawing, Narayana and Kannaiah / Scietech publishers. Engineering Drawing, Narayana and Kannaiah / Scietech publishers.
4. Engineering Drawing Basanth Agrawal/ C M Agrawal; 2e Mc Graw Hill Education

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA STRUCTURES

Course Code: GR15A1010 L:2 T:1 P:0 C:3

Prerequisites: Intermediate programming in a high-level language and introduction to computer science. Topics include program structure and organization, data structures (lists, trees, stacks, queues) C is the principal programming language.

Course Objectives: The objective of this course is to provide

- Summarize the basic data structures.
- Articulate the recursive methods.
- Analyse a problem and prioritize the appropriate data structures.
- Implement the applications of various data structures.
- Enumerate the advantages and disadvantages of data structures.
- Express the importance of data modelling and data structures in advanced programming.
- Demonstrate and correlate basic sorting, searching and hashing algorithms.

Course Outcomes: At the end of the course, the Student will be able to

- Inferring various data structures.
- Demonstrate data structures operations like insertion, searching, deletion and traversing.
- Exemplifying and experiment basic data structures.
- Compare and contrast the benefits of dynamic and static data structures implementations
- Demonstrate different methods for traversing trees
- Compare and contrast the various data structures performance.
- Recite data structures concepts in other domains like databases, compiler construction.

Unit-I

Introduction to data structures: Stacks, Stack Operations, Representation of a Stack using Arrays, Stack Applications: Recursion, Infix to postfix Conversion, Evaluating Arithmetic Expressions.

Unit-II

Queues: Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using arrays, Applications of Queues, Circular Queues, Priority Queues**,** Enqueue, Dequeue.

Unit-III

List: Introduction, single linked list, representation of a linked list in memory, Operations-insertion, deletion, display, search, circular linked list, Double linked list, Applications advantages and disadvantages of single linked list, Implementation of stack, queue using linked list.

Unit-IV

Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operations on a Binary tree , Binary Tree Traversals (recursive), Creation of binary tree from in-order and pre(post)order traversals.

Unit-V

Sorting and Searching: Insertion (Insertion sort), selection (heap sort) and selection soft, exchange (bubble sort, quick sort), distribution (radix sort) and merging (merge sort) Algorithms, Searching: Linear, binary search, indexed sequential search.

Teaching Methodologies

1. White Board
2. Marker
3. LCD Projector
4. OHP Projector

Text Books

1. Data Structures, 2/e, Richard F, Gilberg, Forouzan, Cengage
2. Data Structures and Algorithms, 2008,G.A.V.Pai, TMH

Reference Books

1. Data Structure with C, Seymour Lipschutz, TMH
2. Classic Data Structures, 2/e, Debasis, Samanta, PHI, 2009
3. Fundamentals of Data Structure in C, 2/e, Horowitz, Sahni, Anderson Freed, University Press

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

IT WORKSHOP

Course Code: GR15A1026 L:0 T:0 P:2 C:2

Prerequisites:

- Fundamentals of Computer and its parts.
- Identification of peripherals of computer.

Course Objectives: The objective of this course is to provide

- Introduce the students to a PC, its basic peripherals and to install different software.
- Enhance the ability of the students in effective usage of Internet using web browsers and tools.
- Design professional word documents; excel spread sheets and power point presentation using Microsoft office tools.
- Illustrate the basic knowledge about the networking devices – Routers and Switches
- Develop basic networks using different cables and different networking devices.
- Illustrate the basic knowledge of HTML and to create a static website.
- Illustrate the basic knowledge on DBMS concepts and store the data in database.

Course Outcomes: At the end of the course, the Student will be able to

- Recognize different peripherals and install different system and application softwares.
- Analyze and explore the use of web browsers and related tools for information extraction.
- Create different documents, presentations and spreadsheet applications.
- Recognize different network devices and their usage.
- Recognize and use different cables.
- Design a static webpage.
- Design and develop Database.

PC Hardware introduces the students to a personal computer and its basic peripherals, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on working PC to install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced. Productivity tools module would enable the students in crafting professional word documents, spread sheets and slide presentations.

Task-1

Installation of OS Every student should install Ubuntu and RedHat Linux on the computer. Lab instructors should verify the installation and follow it up with viva.

Task-2

Hands on experience on OpenOffice: Every student should install open office on the computer. Students would be exposed to create word documents with images, tables, formula and with additional word processing features, Power point presentation, Excel and access. Lab instructors should verify the installation and follow it up with viva.

Task-3

Internet Based Applications: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google.

Task-4

Networking-Network Infrastructure: Understand the concepts of Internet, intranet, and extranet, local area networks (LANs), Wide area networks (WANs), Wireless networking, network topologies and access methods

Task-5

Network Hardware: Understand switches, routers, media types. static routing, dynamic routing (routing protocols), default routes; routing table and how it selects best route(s); routing table memory, network address translation (NAT).Introduction to Cisco Packet Tracer, design LAN using routers and switches.

Task-6

Network Protocols: Understand the Open Systems Interconnection (OSI) model, IPv4, IPv6, tunnelling, dual IP stack, subnet mask, gateway, ports, packets, reserved address ranges for local use (including local loopback IP) Understanding Cisco Router and Switches.

Task-7

Network Services: Understand names resolution, networking services, TCP/IP-Tools (such as ping), tracert, pathping, Telnet, IPconfig, netstat, reserved address ranges for local use (including local loopback IP), protocols.

Task-8

Database -Core Database Concepts: Understand how data is stored in tables, Understanding DML and DDL statements.

Task-9

Creating and Insertion of Data: Understanding Data types, tables and how to insert data in to the tables.

Task-10

HTML Basic HTML Tags: Understand what are the tags used for creation of website.

Task-11

Designing a Static web page: Understand how to create static web page using forms and tables.

Teaching methodologies

- Power Point presentations.
- Assignments.
- Hands on experiment.

References Books

1. Introduction to Information Technology, ITL Education Solutions Limited, Pearson Education.
2. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
3. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
4. Comdex Information Technology Course tool kit Vikas Gupta, WILEY Dreamtech
5. IT Essentials PC Hardware and Software Companion Guide, Third Edition by David Anfinson and Ken Quamme- CISCO Press, Pearson Education
6. PC Hardware and A+Handbook – Kate J. Chase PHI(Microsoft)
7. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc- Graw Hill
8. Introduction to Database Systems, C.J.Date Pearson Education.
9. Networking Fundamentals, Wiley, by Microsoft Official Academic Course, 1st Edition .

Suggested Tutorials on Lab:

Tutorial/Lab 1: Installation of Ubuntu and RedHat Linux on the computer. Lab instructors should verify the installation and follow it up with viva

Tutorial/Lab 2: Students would be exposed to create word documents with images, tables, formula and with additional word processing features, Power point presentation, Excel and access. Lab instructors should verify the installation and follow it up with viva.

Tutorial/Lab 3: Understand the concepts of networking topics. **Tutorial/Lab 4:** DDL and DML statements

Tutorial/Lab5: Designing of static web page and verify it.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY LAB

Course Code: GR15A1030 L:0 T:0 P:2 C:2

Prerequisites: Fundamentals in Engineering Chemistry Laboratory

Course Objectives: The objective of this course is to provide

- Introduce practical applications of chemistry concepts to engineering problems.
- Know the laboratory practices implemented in a research and industrial chemistry laboratory.
- Explain the water analysis techniques for removing impurities.
- Demonstrate redox chemistry for analysing engineering materials like cement.
- Explain the measurement of physical properties like viscosity and surface tension of lubricants.

Course Outcomes: At the end of the course, the student will be able to

- Perform analysis of water to the required industrial standards.
- Apply the redox and acid-base titrations for analysing materials used in routine usage like cement, coal, acid in lead acid battery, etc.,
- Develop the skills required for assessing the quality of materials used in industries.
- Design novel ways of instrumental methods of analysis.
- Know the correlation between the measured property and the corresponding application.
- Understand scientific method of designing experiment and learn the skill necessary to perform it.
- Know how to innovate to design alternative energy sources utilizing chemistry for sustainable environment for future generations

List Of Experiments

1. Estimation of Total Hardness in sample water by complexometry
2. Estimation of percentage available chlorine in Bleaching Powder.
3. Estimation of Fe^{2+} by permanganometry.
4. Determination of strength of an acid by potentiometric titration method
5. Determination of strength of an acid by using conductometry.
6. Determination of Strength of an acid in Pb-Acid battery by titrimetric method
7. Determination of percentage of Iron in Cement sample by colorimetry..
8. Estimation of Calcium in port land cement.

9. Determination of Viscosity of the given unknown liquid by Oswald's viscometer.
10. Determination of surface tention of the given unknown liquid by stalagmometer.
11. Preparation of Thiokol rubber.
12. Determination of percentage Moisture content in a coal sample.

Reference Books

1. Laboratory Manual on Engineering Chemistry, by Dr Sudha Rani, Dhanpat Rai Publishing house.
2. A Text book on Experiments and calculations in Engineering Chemistry, by SS Dara, S Chand publications.
3. Laboratory Manual of Organic Chemistry, by Raj K Bansal, Wiley Eastern Limited, New age international limited.
4. Engineering Chemistry practical manual prepared by faculty of engineering chemistry, GRIET(A) - (for college circulation only)

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

BUSINESS COMMUNICATION AND SOFT SKILLS

Course Code: GR15A1024 L:0 T:0 P:2 C:2

Prerequisites: Familiarity with basic language and communication skills.

Course objectives: The objective of this course is to provide the student with

- Recognize the role and importance of language and communication skills.
- Know the importance and application of phonology.
- Employ the acquired knowledge in classroom with reference to various social and professional spheres.
- Develop the sense of right usage of formal communication.
- Equip with the skills of listening, critical thinking and writing.
- Acquire the ability to work in teams.

Course outcomes: At the completion of this course the student will be able to

- Interpret the role and importance of various forms of communication skills.
- Utilize various media of verbal and non-verbal communication with reference to various professional contexts.
- Enabled to tote professional responsibilities in ananalytical manner.
- Accredit the activity of sequencing ideas in an efficacious style.
- Evaluate and use a neutral and correct form of English.
- Formulate behavior in various formal situations.
- Integrate business communication & soft skills to meet the requirement of corporate communication.

Unit-I

Just A Minute (JAM): Introduction to public speaking, analyzing and assimilating ideas, audience, voice modulation, Pronunciation and enunciation.

Unit-II

Phonetics: Introduction to speech sounds; identification of sound symbols; vowel and consonants

Unit-III

Roleplay: Introduction to role play; situation handling; non-verbal communication

Unit-IV

Debate: Introduction and features of Debate; Types of Debate; Understanding critical thinking; building sustainable arguments; assessing credibility of the argument; overcoming obstacles

Unit-V

Describing a Person, Situation, Process and Object: Introduction to techniques of clear, brief and impersonal description to a listener or reader.

Unit-VI

Letter Writing: Manual and Emailing, types and formats, content and body of the letter. Email etiquette.

Unit-VII

Report Writing: Formats and types of reports

Unit-VIII

Mind Mapping: Assimilation of thoughts, expansion of ideas on central idea, suggesting parameters to carry forward the thinking process without deviation.

Reference Books

1. Business Communication; Hory Sankar Mukerjee; Oxford University Press
2. Business Communication; Meenakshi Raman, Prakash Singh; Oxford University Press
3. English and Soft skills; SP DHanavel; Orient Blackswan
4. Soft Skills for Everyone; Jeff Butterfield; Cengage Learning
5. Communication Skills; Viva Career Skills Library
6. Personality Development and Soft Skills; Barun K Mitra; Oxford University Press
7. Six Thinking Hats, Penguin Books, Edward De Bono
8. English for Engineer's; Aeda Abidi, Ritu Chaudhry; Cengage Learning
9. Communication Skills ; Sanjay Kumar , Pushpalatha; Oxford University Press
10. Business English : The Writing Skills you need for today's work place: Geffner, Andrea: Fifth edition, Barron's Educational Series, Newyork

Software Used

1. Sky Pronunciation Suite
2. Clarity
3. Mastering English

SYLLABUS

II-Year

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

SPECIAL FUNCTIONS AND COMPLEX VARIABLES

Course Code: GR15A2058 L:2 T:1 P:0 C:3

Prerequisites: Co-ordinate Geometry, Calculus, Linear Differential Equations

Course Objectives: The objective of this course is to provide

Provide an overview of differential equations which occur in physical and engineering problems?

- Explain solution of certain special types of differential equations like Bessel's differential equations Legendre differential equations and Chebeshev differential equations, and also on study of complex variables.
- Provide an overview of functions of complex variables which helps in solving many complex problems in heat conduction, fluid dynamics and electrostatics?
- Introduce the concepts of complex Integration and Applications of complex integration
- Identify the significant applications of Complex Power Series.

Course Outcomes: At the end of the course, the student will be able to

- Solve linear differential equations using power –series methods.
- Approximate polynomials in terms of Legendre, Bessel and chebyshev.
- Evaluate Real definite Integrals using Cauchy's Residue Theory.
- Interpret geometrically the Complex functions and their qualitative behavior in the Complex Plane.
- Describe Singularity and Residue Theory.
- Solve potential functions, stream functions and velocity potential.
- Illustrate the concepts of residues in the context of determination of real integrals.

Unit-I

Special Functions-I: Solution to Cauchy-Euler Problem. Introduction to series solution of differential equations. Legendre polynomials (as solution of second order differential equation) – properties – Rodrigue's formula – recurrence relations – orthogonality.

Unit-II

Special Functions-II: Bessel Functions – properties – recurrence relations – orthogonality. Chebyshev polynomials (as solution of second order differential equation) – properties – recurrence relations – orthogonality.

Unit-III

Functions of a Complex variable: Continuity – differentiability – Analyticity – Cauchy-Riemann equations – Maxima-minima principle – Harmonic and conjugate harmonic functions – Milne-Thompson method.

Elementary functions: General power Principal value. Logarithmic function.

Conformal mapping: Transformations e^z, Im z, Z^2, Z^n (n is a positive integer), sinz, cosz, z + (a/z). Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – invariance of circles and cross ratio – determination of bilinear transformation mapping of 3 given points

Unit-IV

Complex integration: Line integral – evaluation along a path – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.
Complex power series
Radius of convergence : Expansion in Taylor series, Maclaurin's series, Laurent series.

Unit-V

Singular points, Residues and Applications of Complex Integration: Singular points – isolated singular point – pole of order m – essential singularity. (Distinction between real analyticity and complex analyticity). Residue – Evaluation of residue by formula and by Laurent series – Residue theorem.

Evaluation of real integrals of the types

(a) Improper integrals $\int_{-\infty}^{\infty} f(x)dx.$

(b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta.$

(c) $\int_{-\infty}^{\infty} f(x) * \cos(mx)dx.$

(d) Integrals by indentation.

Teaching methodologies

1. Tutorial sheets uploaded in website
2. NPTEL video lectures
3. MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar - Narosa Publishing House
2. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley Publications

Reference Books

1. Schaum's Outline series on complex variables.
2. Higher Engineering Mathematics: B.S. Grewal, Khanna Publications

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER ORGANIZATION

Course Code: GR15A2076 L:3 T:1 P:0 C:4

Prerequisites: Knowledge of Digital Logic Design.

Course Objectives: The Objectives of this course is to provide

- Comprehend operational concepts and understand register organization within a basic computer system
- Analyze the basic computer organization and understand the concepts of Micro programmed control
- Understand the design aspects of Central processing unit organization
- Understand various algorithms for arithmetic operations within a computer system
- Study the different ways of communicating with I/O devices and standard I/O interfaces.
- Study the hierarchical memory system including cache memory and virtual memory.
- Design of Multiprocessor systems using various interconnection structures

Course Outcomes: At the end of the course, the student will be able to

- Demonstrate knowledge of register organization of a basic computer system
- Incorporate In-depth understanding of control unit organization and micro programmed control.
- Understand the performance of central processing unit of a basic computer system.
- Apply various algorithms to perform arithmetic operations and propose suitable hardware for them.
- Analyze and emphasize various communication media in the basic computer system
- Develop an ability to analyze and design various memory structures
- Analyze the performance of a Multiprocessor System and various issues associated with its design.

Unit-I

Basic Structure of Computers: Computer Types, Functional unit, Data Representation, Fixed Point Representation, Floating – Point Representation, Error Detection codes.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

Unit-II

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit, Micro program Sequencer, Hard wired control Vs Micro programmed control.

Unit-III

Central Processing Unit Organization: General Register Organization, STACK organization, Instruction formats, Addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction Set Computer.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Floating – point Arithmetic operations, BCD Adder.

Unit-IV

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP).

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, Dependencies, Vector Processing.

Unit-V

Memory Organisation: Memory Hierarchy, Main memory- RAM and ROM chips, Memory Address map, Auxiliary memory – Magnetic Disks, Magnetic Tapes, Associative Memory – Hardware Organization, Match Logic, Cache Memory – Associative mapping, Direct mapping, Set associative mapping, Writing into cache and cache initialization, Cache Coherence, Virtual memory – Address Space and Memory Space, Address mapping using pages, Associative Memory page table, Page Replacement.
Multi Processors: Characteristics or Multiprocessors, Interconnection Structures, Cache Coherence, Shared Memory Multiprocessors.

Teaching Methodologies

1. Power Point Presentations
2. Tutorial Sheets
3. Assignments

Text Books

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRO MAGNETIC FIELDS

Course Code: GR15A2034 L:3 T:1 P:0 C:4

Prerequisites: Knowledge of Basic Electrical and Electronics Engineering (BEE), Vector Algebra.

Course Objectives: The Objectives of this course is to provide

- Basic skills required to understand, develop, and design various engineering applications involving electromagnetic fields
- Knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission, propagation and reception of electro- magnetic wave systems
- Concept of conductors, dielectrics, inductance and capacitance
- Knowledge on the nature of magnetic materials.
- identify, formulate and solve fields and electromagnetic waves propagation problems in a multi- disciplinary frame individually or as a member of a group
- Solid foundation in engineering fundamentals required to solve problems and also to pursue higher studies
- Foundations of electromagnetism and its practice in modern communications such as wireless, guided wave principles such as fiber optics and electronic electromagnetic structures.

Course Outcomes: At the end of the course, the student will be able to

- Solve the problems in different EM fields
- Design a programming to generate EM waves subjected to the conditions
- Find the time average power density of EM Waves in different domains
- Know the Electromagnetic Relation using Maxwell Formulae
- Solve Electro Static and Magnetic to Static circuits using Basic relations.
- Analyze moving charges on Magnetic fields.
- Design circuits using Conductors and Dielectrics

Unit–I

Electrostatics: Electrostatic Fields Coulomb's Law ,Electric Field Intensity (EFI) EFI due to a line and a surface charge, Work done in moving a point charge in an electro static field, Electric Potential, Properties of potential function, Potential gradient, Guass's law ,Application of Guass's Law, Maxwell's first law, div (D) =ρυ. ,Laplace's and Poison's equations, Solution of Laplace's equation in one variable. Electric dipole, Dipole moment, Potential and EFI due to an electric dipole, Torque on an Electric dipole in an electric field.

Unit-II

Dielectrics &Capacitance: Behaviour of conductors in an electric field, Conductors and Insulators, Electric field inside a dielectric material, Polarization, Dielectric-Conductor and Dielectric-Dielectric boundary conditions, Capacitance, Capacitance of parallel plates, Spherical, Co-axial capacitors with composite dielectrics, Energy stored and energy density in a static electric field, Current density, Conduction and Convection Current densities, Ohm's law in point form. Equation of continuity.

Unit-III

Magneto Statics :Static magnetic fields Biot-Savart's law, Magnetic Field Intensity (MFI),MFI due to a straight current carrying filament, MFI due to circular, square and solenoid current Carrying wire, Relation between magnetic flux and magnetic flux density –Maxwell's second Equation, div(B)=0. Ampere's Law &Applications: Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament–Point form of Ampere's Circuital law. Maxwell's third equation, Curl (H) =Jc.

Unit-IV

Force in Magnetic fields: Magnetic force Moving charges in a Magnetic field, Lorentz force equation, Force on a current element in a magnetic field, Force on a straight and a long current carrying conductor in a magnetic field, Force between two straight long and parallel current carrying conductors, Magnetic dipole and dipole moment, A differential current loop as a magnetic dipole, Torque on a current loop placed in a magnetic field. Scalar Magnetic potential and its limitations, Vector magnetic potential and its properties, Vector magnetic potential due to simple configurations, Vector Poisson's equations. Self and Mutual inductance, Neumann's formulae, Determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane, Energy stored and density in a magnetic field. Introduction to Permanent magnets, their characteristics and applications.

Unit-V

Time Varying Fields: Time varying fields – Faraday's laws of electromagnetic induction, its integral and point forms, Maxwell's fourth equation, Curl (E) =-dB/dt, statically and dynamically induced EMFs, Simple Problems, Modification of Maxwell's equations for time varying fields, Displacement current.

Teaching Methodologies

1. EMF PPTs
2. Assignments uploaded in website
3. Software: MATLAB.

Text Book

1. "Engineering Electro Magnetics" by William H. Hayt& John. A. Buck Mc.Graw-Hill Companies, 7thEditon.2009.
2. "Electro Magnetic Fields" by Sadiku, Oxford Publications

Reference Books

1. “Introduction to Electro Dynamics” by DJ Griffiths, Prentice-Hall of India Pvt.Ltd. 2ndEdition.
2. “Electro Magnetics” by JP Tewari.
3. “Electro Magnetics” by J.D Kraus McGraw-Hill Inc.4th edition 1992.
4. “Electro magnetism” by Ashutosh Pramanik, PHI Publishers.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

NETWORK THEORY

Course Code: GR15A2035 L:3 T:1 P:0 C:4

Prerequisites : Knowledge of Basic Electrical and Electronics Engineering (BEE).

Course Objectives: The objective of this course is to provide

- Knowledge of three phase voltages and currents relations in star and delta connections.
- Knowledge of dc and ac transient analysis.
- Tie-set and cut-set methods of solving circuits.
- Dot convention, analysis of magnetic circuits.
- Introduction to various two-port network parameters for a given circuit.
- Evaluation of LPF, HPF, BSF and BPF.
- Evaluation of poles and zeros of a given transfer function.

Course Outcomes: At the end of the course, the student will be able to

- Measure Three phase voltages and currents, active, reactive powers.
- Express given Electrical Circuit in terms of A,B,C,D and Z,Y Parameter Model and solve the circuits.
- Solve Circuits using Cut set ,Tie Set Methods.
- Analyse dc and ac transient analysis for given circuit.
- Analyse LP, HP, BS and BP filters.
- Apply dot convention and to find out self and mutual inductance for a given circuit.
- Know poles and zeros of a given transfer function.

Unit-I

Magnetic Circuits and Network Topology Magnetic Circuits: Faradays laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling, analysis of series and parallel magnetic circuit, composite magnetic circuit.
Network Topology Definitions - graph, tree, co-tree, twig, link, basic cutset and tieset matrices for planar networks, loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, Duality and Dual networks.

Unit-II

Three Phase Circuits Phase Sequence, Relation between line and phase voltages and currents in Star-Star, Delta-Delta, Star-Delta and Delta-Star balanced connections, analysis of unbalanced three phase circuits, measurement of active and reactive power.

Unit-III

DC and AC Transient Analysis

DC Transient Analysis: Transient response of RL, RC, RLC circuits(series and parallel) for dc excitation by classical approach and Laplace Transform methods, Initial Conditions, Transient response of RL and RC circuits for different inputs such as step, ramp, pulse and impulse using Laplace Transform method.

AC Transient Analysis Transient response of RL, RC, RLC circuits for sinusoidal excitation by classical and Laplace Transform methods.

Unit-IV

Network Parameters and Two Port Networks Driving point and transfer impedance function networks, poles and zeros necessary conditions for driving point function and for transfer function. Two port network parameters- Z, Y, hybrid, inverse hybrid, transmission and inverse transmission parameters, relation between various parameters, condition for symmetry and reciprocity for above parameters, two port network parameters using transformed variables.

Unit-V

Filters Introduction to filters, constant K - RC, RL low pass, high pass, band pass, band stop filters.

Teaching Methodologies

1. NT ppts
2. Assignments uploaded in website
3. Softwares: Multisim.

Text Book

1. Fundamentals of Electric Circuits by Charles K.Alexander, Matthew N.O.Sadiku, Tata McGraw Hill Company.
2. Engineering Circuit Analysis by William H.Hayt.Jr, Jack E.Kemmerly and Steven M.Durbin by Tata McGraw Hill Company.
3. Circuits and Networks by T.K.Nagasarkar and M.S.Sukhija, Oxford University Press

Reference Books

1. Circuit Theory (Analysis and Synthesis) by A.Chakrabarti – DhanpatRai& Co
2. Network Theory by prof.B.N.Yoganarasimham.
3. Electrical Engineering Fundamentals by Vincent Deltoro
4. Circuit Theory by Sudhakar and ShyamMohan
5. Network Analysis by M.E.VanValkenburg, Prentice Hall of India

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DC MACHINES AND TRANSFORMERS

Course Code: GR15A2036 L:3 T:1 P:0 C:4

Prerequisites: In-depth knowledge of Physics oriented towards dynamics, heat, electricity, magnetism and calculus, analytical co-ordinate geometry and trigonometry.

Course Objectives: The objective of this course is to provide

- Strong back ground in different types of electrical DC machines.
- Visualization of solid foundation in mathematical and technical concepts required to engineering problems related to dc machines.
- Excel in post graduate programs or to succeed in industry.
- Foundation in the construction and operation of dc machines and its applications
- Background in single phase and three phase transformers.
- Foundation in design & applications of transformers.
- Basic knowledge of equivalent circuit of transformers and their phasor diagrams for different loads viz lead, lag & pure resistive loads.

Course Outcomes: At the end of the course, the student will be able to

- Understand energy conversion principles in DC machines & Transformers.
- Analyse role of Electrical machines in simple & complex applications.
- Articulate importance of extensive research in electrical machines.
- Design real time applications.
- Calculate AT required for different magnetic loading
- Draw armature winding for DC Machines
- Conduct test for voltages , currents, torque and speed curves for DC machines of various types.

Unit-I

D.C.Generators – Principle of operation– Action of commutator– constructional features– armature windings– lap and wave windings– simplex and multiplex windings–use of laminated armature– E.M.F Equation.

Armature reaction–Cross magnetizing and de-magnetizing AT/pole– compensating winding– commutation–reactance voltage–methods of improving commutation. Methods of Excitation – separately excited and self excited generators–build-up of E.M.F-critical field resistance and critical speed-causes for failure to self excitation and remedial measures. Load characteristics of shunt, series and compound generators.

Unit-II

D.C Motors–Principle of operation–Back E.M.F.-Torque equation– Characteristics and application of shunt, series and compound motors–Armature reaction and commutation.
Speed control of D.C. Motors: Armature voltage and field flux control methods. Motor starters (3 point and 4 point starters).

Unit-III

Testing of D.C. machines: Losses–Constant &Variable losses– calculation ofefficiency–condition for maximum efficiency.
Methods of Testing – Direct, indirect and regenerative testing–Brake test– Swinburne's test – Hopkinson's test – Field's test-separation of stray losses in a D.C .motor test.

Unit-IV

Transformers-Single phase transformers-types - constructional details- minimization of hysteresis and eddy current losses-EMF equation-operation on no load and on load- phasor diagrams Equivalent circuit- losses and efficiency- regulation. All day efficiency- effect of variations of frequency &supply voltage on iron losses.

Unit-V

Tests- OC and SC tests - Sumpner's test - predetermination of efficiency and regulation-separation of losses -parallel operation with equal and unequal voltage ratios- Auto transformers- equivalent circuit- comparison with two winding transformers. Poly phase transformers-Poly phase connections-Y/Y, Y/D, D/Y, D/D and open D.

Teaching Methodologies

1. EM-Ippts
2. Assignments uploaded in website

Text Books

1. Electric Machines by I.J. Nagrath&D.P. Kothari, Tata McGraw–HillPublishers, 3rdedition, 2004.
2. Electromechanics–I (D.C. Machines) S. KamakshaiahHi-Tech Publishers.
3. Electrical Machines by Rajput

Reference Books

1. Performance and Design of D.C Machines–by Clayton &Hancock, BPB Publishers
2. Electric Machinary–A.E.Frizgerald, C.Kingsleyand S.Umans, McGraw- Hill Companies, 5thediton
3. Electrical Machines–P.S. Bimbra., Khannapublishers
4. Electrical Machines - Bandhyopadhyaya

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DC MACHINES LAB

Course Code: GR15A2037 L:0 T:0 P:2 C:2

Prerequisites: In –depth knowledge of D.C. Machines.

Course Objectives: The Objectives of this course is to provide

- Strong background in different types of excitation for dc motors and generators.
- Mathematical foundation and there by the relative production of emf with respect to flux.
- Knowledge on various lab experiments connected with dc motors.
- Knowledge on various lab experiments connected with dc generators and there by achieve the design concepts.
- Knowledge on application of dc motor concepts with respect to the performance characteristics of dc motors.
- Knowledge on application of dc generator concepts with respect to the performance characteristics of dc generators.
- Basic knowledge of drive systems for further study at post graduate level.

Course Outcomes: At the end of the course, the student will be able to

- Have knowledge of various parts of a electrical DC machines.
- Develop knowledge helpful for application of dc machines.
- Conduct speed control of different types of DC Motors.
- Use characteristics of various generators depending on their type of field excitation.
- Understand the concept of different types of windings viz lap and wave for armature.
- Perform test on Motor-Generator Set.
- Know the concept of commutation dc machines for conversion of AC to DC or DC to AC.

Contents

1. Speed Control of a D.C Shunt Motor
2. Brake Test on a DC Shunt Motor
3. Brake Test on a DC Compound Motor
4. Open Circuit Characteristics of a DC Shunt Generator
5. Load test on a D.C. Shunt Generator.
6. Load test on a D.C. Series Generator
7. Load test on D.C. Compound Generator
8. Hopkinson Test
9. Fields Test
10. Retardation Test on D.C. Shunt Motor
11. Swinburne's Test
12. Separation of Core Losses

Students Activity: Design of machine windings using software.

i) Lap winding for 12 slots 4-pole single layer progressive winding.
ii) Lap winding for 12 slots 4-pole single layer retrogressive winding.
iii) Double layer winding for 24 slots 4-pole progressive lap wound machine.
Iv) Double layer winding for 30 slots 4-pole progressive lap wound machine.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRICAL NETWORKS LAB

Course Code: GR15A2038 L:0 T:0 P:2 C:2

Prerequisites: In –depth knowledge of Networks.

Course Objectives: The objective of this course is to provide

- Concept of circuit elements lumped Circuits and various types of sources,V-I relation for various input signals and Kirchhoff's Laws and network reduction techniques.
- Concept of alternating quantities, analysis of R, L, C parameters applied with ac sinusoidal voltage, concept of reactance, impedance, susceptance and admittance and concept of real and reactive powers and power factor.
- Knowledge on network topology a technique used for analyzing and solving electrical networks, loop analysis and nodal analysis method, concept of duality and dual networks, concept of KVL & KCL.
- Concept of resonance, bandwidth, measurement of reactive and active power and measurement three phase voltages and currents.
- Concept of Superposition theorem for dc and ac. Excitations, Thevenin's theorem, Norton's theorem Maximum power transfer theorem, Compensation theorem for dc and ac excitations.
- Demonstration on networks thermos using components on breadboard.
- Simulation of an electrical circuit using electrical softwares

Course Outcomes: At the end of the course, the student will be able to

- Understand the knowledge of mathematics, science and engineering.
- Identify, formulate and solve engineering problems.
- Analyze and design basic lumped circuits.
- Participate and try to succeed in competitive examinations.
- Simulate network circuits.
- Use techniques, skills and modern engineering tools necessary for engineering practice.
- Connect hardware components practically on breadboard.

Contents

1. Thevenin's Theorem
2. Norton's Theorem
3. Maximum power Transfer Theorem
4. Superposition Theorem and Reciprocity Theorem
5. Z and Y parameters.
6. Transmission and Hybrid Parameters

7. Compensation and Milliman's Theorems
8. Series Resonance
9. Parallel Resonance
10. Locus of Current Vector in an R-L Circuit
11. Locus of Current Vector in an R-C Circuit
12. Measurement of 3-phase power by two watt meter method for unbalanced loads

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRICAL SIMULATION LAB

Course Code: GR15A2039 L:3 T:1 P:0 C:4

Prerequisites: Knowledge of Basic Electrical Engineering

Course Objectives: The objective of this course is to provide

- Strong background on electrical software's.
- Approach for solving engineering problems.
- Use electrical software's in their project works.
- Foundation for use of these software's in real time applications.
- Development of data acquisition, instrument control, data-logging, and measurement analysis applications.
- Knowledge about user-defined software and modular hardware that implements custom systems(virtual instruments)
- Knowledge about simpler system integration for hardware and their corresponding software

Course Outcomes: At the end of the course, the student will be able to

- Express programming and simulation for engineering programs.
- Know importance of these software's for lab experimentation.
- Articulate importance of software's in research by simulation work.
- In-depth knowledge of providing virtual instruments on lab view environment.
- Simulate basic electrical circuit in mat lab simulink.
- Solve and execute complex algorithms in real time.
- Integrate hardware and their corresponding software

MATLAB Contents

1. The Basics
2. Strings, Logic and Control Flow
3. Polynomials, Integration& Differentiation
4. Introduction to Simu link
5. Diode characteristics
6. MOSFET characteristics
7. IGBT characteristics
8. Transient analysis of linear circuit
9. Single phase Half wave diode rectifier
10. Single phase full wave diode rectifier

11. Single phase diode bridge rectifier with LC filter
12. 5Hp 240V DC motor with resistance starter
13. Three phase half wave diode rectifier

LABVIEW Contents

1. Virtual Instruments
2. Editing Techniques, Building VI, Creating the Sub VI
3. Using For loop, While loops and Charts
4. Creating an Array with Auto-Indexing
5. Using the Graph and Analysis VIs
6. Simple amplitude measurement
7. Building arrays using for loop and while loop
8. Random signal generation
9. Waveform minimum & maximum value display
10. Wave at interface
11. Force mass spring damper
12. Matrix fundamentals
13. Simple Pendulum
14. Three phase sine wave generation
15. Signal Modulation

Sci lab

1. Single phase half wave diode rectifier
2. Create the vector(X_1^2, X_2^2, X_3^2, X_4^2) with X=1,2,3,4

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL SCIENCE

Course Code: GR15A2001 L:2 T:0 P:0 C:0

Prerequisites: Basic knowledge on basic sciences and natural resources

Course Objectives: The Objectives of this course is to provide

- Critically evaluate information on human/environmental system
- Integrate human ecology and science of environmental problems.
- Articulate issues of social construction of science
- To develop an understanding of systems and cycles on the earth: of how individual organisms
- Live on the earth
- How different organisms live together in complex communication
- The agricultural use of soil and pesticides
- The description of moving water on and in the earth, and its influence on humans
- The effect of human activities on atmospheric pollution and that effect on us.
- Use of fossil fuels and the effect on climate
- Alternate energy sources
- An understanding of human activities that influence the ocean.

Course Outcomes: At the end of the course, the Student will be able to

- Importance of environment, its purpose, design and perspectives
- Environmental issues related to the exploitation of natural resources and development of the mankind
- Role of professionals in protecting the environment from degradation
- The solutions for environmental problems created by local, national and global Developmental activities.
- Critically evaluate literature on environmental problems;
- Develop relevant research questions for environmental investigation
- Use methods and tools of environmental research, including statistical analysis, GIS, and other techniques;

Unit-I

Introduction to Environment, Ecology and Ecosystems: Definition, Importance and Scope of Environmental Studies, Public Awareness and Participation. Ecology, Concept of Ecosystem, Classification of Ecosystem, Structure, Components and Function of Ecosystem. Typical Ecosystem, Food Chain, Food Web. Biodiversity- Types and values.

Unit–II

Natural Resources: Definition, Occurrence, Classification of resources, Important natural resources for human society, Utilization-positive and negative effects of Water resources, Mineral resources, Forest resources, Energy resources, Land resources. Role of individuals in conservation of important natural resources.

Unit-III

Environmental Pollution: Definition, Classification of Pollution, Types of Pollution and Pollutants. Causes, effects and control of – Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution and Nuclear Pollution.

Unit-IV

Environmental Problems and Management Policies: Natural Disasters-Types, causes and effects; Global warming, Climate change-El Nino-La Nina, Ozone layer- location, role and degradation; Deforestation and desertification. Management: Technological solutions, Preventive methods, control techniques; Green Belt development, Rainwater harvesting, Renewable and alternate resources.

Unit-V

National Policy on Environment Protection and Sustainability: Air (Pollution and prevention) act 1981; Water (Pollution and prevention) Act 1974; Pollution Act 1977; Forest Conservation Act; Wildlife Protection Act; Municipal solid waste management and handling Act; Biomedical waste management and handling Act; Hazardous waste management and handling rules. Role of IT in environment, environmental ethics, environmental economics.

Sustainable development: Cause and Threats to sustainability; Strategies for achieving sustainable development; Concept of Green buildings and Clean Development Mechanism (CDM).

Teaching Methodology

1. White board and marker
2. OHP and Field visit

Text Books

1. Text Book of Environmental Studies, ErachBarucha. University Press
2. Text book of Environmental Science and Technology by M.Anji Reddy 2007

Reference Books

1. Biotechnology & Environmental Chemistry. Surinder Jeswal& Anupama Deswal, DhanpatRai & Co Pvt. Ltd.
2. A Text Book of Environmental Science. Aravind Kumar. APH Publishing Corporation.
3. Glimpses of Environment. Dr. KVSG. Murali Krishna. Environmental Protection Society

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: GR15A2104 L:2 T:1 P:0 C:3

Course Objectives: The Objectives of this course is to provide

- Clear understanding of demand analysis, elasticity of demand and demand forecasting
- Production function and cost analysis necessary to decide the levels of production and cost of production of the products or services
- Different types of markets and competition, different forms of organisation and different methods of pricing
- Capital and capital budgeting
- Fundamentals of accounting and financial analysis.

Course Outcomes: After studying this course the engineering students - the prospective technocrats or techno-managers will be in a position to:

- understand the markets and competition;
- forecast the demand;
- plan the operations and the production;
- choose an appropriate form of organisation;
- know the cost and decide the price of the products and/or services produced, and
- understand the financial statements and make financial analysis.

Unit-I

Introduction & Demand Analysis: Definition and Scope: Definition, Nature and Scope of Managerial Economics.

Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit-II

Production & Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. **Cost Analysis:** Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit-III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing **Business:** Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types. New Economic Environment: Changing Business Environment in Post-liberalization scenario.

Unit-IV

Capital Budgeting: Capital: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital.
Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method and Internal Rate of Return (IRR) (simple problems).

Unit-V

Introduction to Financial Accounting & Financial Analysis: Accounting Concepts and Conventions - Double-Entry Book Keeping. Accounting Cycle: Journal, Ledger, Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).
Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital structure Ratios and Profitability ratios. Du Pont Chart.

Teaching Methodologies

- Lectures
- Power Point presentations
- Seminars
- Working out problems on black/white boards
- Conducting tutorials
- Giving homework and/or assignments etc.

Text Books

1. **Aryasri:** Managerial Economics and Financial Analysis, TMH, 2009.
2. **Atmanand:** Managerial Economics, Excel, 2008.

Reference Books

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2009
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 2009
3. Lipsey & Chrystel, Economics, Oxford University Press, 2009

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER GENERATION AND DISTRIBUTION

Course Code: GR15A2040 L:3 T:1 P:0 C:4

Prerequisites: Knowledge of Basic Electrical Engineering

Course Objectives: The Objectives of this course is to provide

- Concepts and phenomenon of different sources of power generation.
- Fundamental concepts of electric DC power distribution.
- Concepts of electric AC power distribution.
- Knowledge on tariff methods for electrical energy consumptions in the prospect of optimum utilization of electrical energy.
- Knowledge of different turbines used in the generating stations with the analytical methods.
- Knowledge on classification of substations.
- Idea about the economic aspects of power generation.

Course Outcomes: At the end of the course, the student will be able to

- Articulate power system concepts required to engineering problems.
- Design power system components for a specified system and application
- Analyse various power sources for generation of power merit/Demerits
- Formulate A.C and D.C distribution networks for necessary variable calculation
- Calculate usage of electrical power
- Plot the power/energy demand in the form of graph
- Discuss functions of substations

Unit-I

Thermal Power Stations: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, as hand flue gasses. Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.
Gas and Nuclear Power Stations: Nuclear Power Stations: Nuclear Fission and Chain reaction, Nuclear fuels. Principle of operation of Nuclear reactor. Reactor Components: Moderators, Control rods, Reflectors and Coolants. Radiation hazards: Shielding and Safety precautions. Types of Nuclear reactors and brief description of PWR, BWR and FBR.
Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only)

Unit-II

Hydro electric power stations: Elements of hydro electric power station-types- concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

Hydraulic Turbines: Classification of turbines, Impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, Work done, Efficiencies, Hydraulic design–Draft tube-Theory-Functions and efficiency.

Unit-III

D.C. Distribution Systems: Classification of Distribution Systems, Comparison of DC vs AC and Under-Ground vs. Over Head Distribution Systems. Requirements and Design features of Distribution Systems.-Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) And Ring Main Distributor. A.C. Distribution Systems. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

Unit-IV

Substations: Classification of substations: Air insulated substations- Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

Gas insulated substations (GIS) –Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, busbar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

Unit-V

Economic Aspects of Power Generation: Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors-Numerical Problems. Tariff Methods: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method. Tariff Methods: Flat Rate, Block-Rate, two-part, three – part, and power factor tariff methods and Numerical Problems

Teaching Methodologies

1. PS-I ppts
2. Assignments uploaded in website

Text Books

1. Electrical Power Systems by C. L. Wadhwa New Age International(P) Limited, Publishers1997.
2. A Text Book on Power System Engineering by M. L. Soni, P. V. Gupta, U. S. Bhatnagar and A. Chakraborti, Dhanpat Rai & Co.Pvt.Ltd.,1999.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

AC MACHINES

Course Code: GR15A2041 L:3 T:1 P:0 C:4

Prerequisites: In-depth knowledge of Physics oriented towards dynamics, heat, electricity, magnetism and calculus, analytical co-ordinate geometry and trigonometry, D.C Machines

Course Objectives: The Objectives of this course is to provide

- Strong back ground in 3ø Induction Motor, speed control techniques and its characteristics.
- Solid foundation in technical concepts required to control the speed of 3ø Induction Motor
- Knowledge on applications of 1ø Induction Motor
- Foundation in the theory and applications of above electrical machines.
- Strong background in AC Armature winding design.
- Sufficient background required to conduct the tests on Synchronous generators viz regulation by various methods, load tests and Synchronization for parallel operation.
- Sufficient background in synchronous motor testing of different types of synchronous motor rotors viz salient pole & cylindrical pole machines.

Course Outcomes: At the end of the course, the student will be able to

- Comprehend electrical machinery pertaining to Synchronous machines, Single phase motors in simple & complex applications.
- Express importance of application of electrical AC machines.
- In-depth knowledge of applying the concepts on real time applications.
- Articulate rotating magnetic field generation
- Calculate machine variables in direct and quadrature axis form for salient pole type
- Demonstrate working of single and three phase AC Machines
- Know the concept of harmonics created in supply systems, need for reduction and design of synchronous machines for reducing them.

Unit-I

Poly-phase Induction Motors: Poly-phase induction motors-construction details of cage and wound rotor machines-Production of a rotating magnetic field - Principle of operation - Rotor E.M.F and rotor frequency - Rotor reactance, rotor current and P.F at standstill and during operation.

Unit-II

Characteristics of Induction Motors: Rotor power input, rotor copper loss and mechanical power developed and their inter relation-Torque equation-Deduction from torque equation - Expressions for maximum torque and starting torque - Torque slip characteristic - Equivalent circuit - Phasor

diagram - crawling and cogging. No-load Test and Blocked rotor test –Predetermination of performance-Methods of starting and starting current and Torque calculations
Speed Control Methods: Speed control-change of voltage, change of frequency, V/f ; Injection of an E.M.F into rotor circuit (qualitative treatment only)-Induction generator-Principle of operation.

Unit-III

Construction, Principle of operation, Characteristics & Regulation of Synchronous Generator : Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – Distribution, pitch and winding factors – E.M.F Equation.Harmonics in generated E.M.F. – Suppression of harmonics – Armature reaction - Leakage reactance – Synchronous reactance and impedance – Experimental determination - Phasor diagram – Load characteristics Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – Salient pole alternators – Two reaction analysis – Experimental determination of Xd and Xq (Slip test) Phasor diagrams – Regulation of salient pole alternators.

Unit-IV

Parallel Operation of Synchronous Generator: Synchronizing alternators with infinite bus bars – Synchronizing power torque – Parallel operation and load sharing - Effect of change of excitation and mechanical power input.
Synchronous Motors – Principle of Operation: Theory of operation – Phasor diagram – Variation of current and power factor with excitation – Synchronous condenser – Mathematical analysis for power developed, Hunting and its suppression – Methods of starting – Synchronous induction motor.

Unit-V

Single Phase Motors & Special Motors: Single phase Motors: Single phase induction motor – Constructional features- Double revolving field theory – Split-phase motors – Shaded pole motor.

Teaching Methodologies

1. EM-II ppts
2. Assignments uploaded in website

Text Books

1. Electric Machines –by I. J. Nagrath & D. P. Kothari, Tata Mc Graw Hill, 7th Edition.2009
2. Performance and Design of AC Machines-M. G. Say. BPB Publishers
3. Electrical Machines by Rajput

Reference Books

1. Electric machinery - A.E. Fitzgerald, C. Kingsley and S. Umans, McGraw Hill Companies, 5th edition
2. Electrical machines-P.S Bhimbra, Khanna Publishers.
3. Electrical Machines – J.B. Gupta, S.K. Khataria& Son's Publications
4. Electrical Machines - Bandhyopadhyaya

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONTROL SYSTEMS

Course Code: GR15A2042 L:3 T:1 P:0 C:4

Prerequisites: Knowledge of Laplace Transforms, Differential equations and Matrices.

Course Objectives: The Objectives of this course is to provide

- Introduction on fundamental concepts of control systems
- Concept of block diagram algebra
- Knowledge on mathematical modeling of the system
- Concept of time response analysis of second order systems.
- Knowledge on stability analysis, root locus technique.
- Knowledge on frequency analysis i.e., Bode plots and Nyquist plots.
- Knowledge on controllability and observability

Course Outcomes: At the end of the course, the student will be able to

- Express the basic elements and structures of feedback control systems.
- Represent the mathematical model of a system.
- Apply routh-hurwitz criterion, rootlocus, bode plot and nyquist plot to determine the domain of stability of linear time-invariant system.
- Determine the steady-state response, errors of stable control systems and design compensators to achieve the desired performance.
- Analyse the stability of the system.
- Design lead, lag, lead-lag compensators.
- Express control system models on state space models, to express state transition matrix and calculation of variables.

Unit-I

Concepts of Control Systems and Transfer Function Representation Concepts of Control Systems: Open loop and closed loop control systems, different examples of control systems, classification of control systems, characteristics and effects of feedback, mathematical models differential equations, impulse response and transfer functions, translational and rotational mechanical systems.

Transfer Function Representation Transfer function of DC and AC Servomotor, Synchro transmitter and receiver, Block diagram representation of systems considering electrical systems as examples, Block diagram reduction techniques, signal flow graphs, reduction using Mason's gain formula.

Unit-II

Time Response Analysis Standard test signals, time response of first order systems, characteristic equation of feedback control systems, transient response of second order systems-time domain specifications, steady state response-steady state errors and error constants, effects of proportional derivative, proportional integral systems.

Unit-III

Stability Analysis Concept of stability, Routh stability criterion, qualitative and conditional stability. **Root Locus Technique** The root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root locii. Frequency Response Analysis Frequency domain specifications, Bode diagrams, Determination of frequency domain specifications and transfer function from the Bode diagram-Phase and Gain margin, stability analysis from Bode plots.

Unit-IV

Stability analysis in frequency domain Polar plots, Nyquist plots and applications of Nyquist criterion to find the stability, effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

Unit-V

State Space Analysis of Continuous Systems Concepts of state, state variables and state model, derivative of state models from block diagrams, diagonalization - solving the time invariant state equations, state transition matrix and its properties, Controllability and Observability.

Teaching Methodologies

1. CS ppts
2. Assignments uploaded in website
3. Software's: MATLAB.

Text Book

1. Control Systems by A. Anand Kumar, 2nd edition, PHI Learning Private Limited
2. Automatic Control Systems 8th edition by B. C. Kuo 2003 John Wiley and Son's

Reference Books

1. Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited Publishers, 2nd edition
2. Control Systems Engineering by NISE 3rd Edition John Wiley
3. Modern Control Engineering by Katsuhiko Ogata Prentice Hall of India Pvt Ltd, 3rd edition, 1998.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF DIGITAL ELECTRONICS

Course Code: GR15A2105 L:3 T:1 P:0 C:4

Prerequisites

- Basics of number systems and Electronic devices and circuitry
- Basics of De-Morgan's Laws

Course Objectives: The Objectives of this course is to provide

- Types of number system existing in Digital electronics
- Illustration of Logic gates and their working function with examples
- Implementation of optimization methods of Logic Function
- Difference between types of existing Logic Circuit Design
- Relation of logic functions with real time applications
- Concept of logic function for the logic circuit design
- Construction of Logic Circuits and Counters

Course Outcomes: At the end of the course, the student will be able to

- Identify the different types of number systems and their use.
- Explain the principle concepts of Digital Logic Design.
- Implement the logic circuits using Combinational Logic IC's.
- Distinguish between the Sequential and Combinational Logic Circuits.
- Reconstruct the Logic Circuits for real time applications with Combinational Circuits
- Formulate the Digital Logic Circuit function.
- Design the Logic Circuit using Combinational and Sequential Circuits

Unit-I

Number systems and Boolean algebra: Digital systems, Number - Base Conversions, Octal and Hexa-decimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and standard Forms, Other Logic Operations

Unit-II

Logic Gates: Digital Logic Gates, Integrated Circuits, Gate-level Minimization, The Map Method, Four- Variable Map, Five-Variable Map, Product-of-Sums Simplification, Don't-care Conditions, NAND and NOR Implementation, Exclusive-OR Function.

Unit-III

Combinational logic: Introduction to Combinational circuits, Analysis Procedure, Design Procedure, Code-conversion, Binary Adder - Subtractor, Carry Propagation, Half Subtractor, Full Subtractor, Binary Subtractor, Decimal Adder, BCD adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, and Multiplexers with design examples.

Unit-IV

Sequential Logic: Flip-Flops, Triggering of Flip Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Fundamentals of Asynchronous Sequential Logic: Introduction, Analysis procedure, Circuits with Latches, Design Procedure, Hazards.

Unit-V

Registers and Counters: Registers with parallel load, Shift registers; Serial Transfer, Serial Addition, Universal Shift Register, Ripple Counters; Binary Ripple Counter, BCD Ripple Counter, Synchronous Counters; Binary Counter, Up-Down Counter, BCD Counter, Binary Counter with Parallel Load, Counter with Unused States, Ring Counter, Johnson Counter.

Teaching methodologies

1. Power Point presentations
2. Tutorial Sheets
3. Assignments
4. Lab experiments with Xlinix software

Text books

1. M. Morris Mano and Michael D. Ciletti, Digital Design, Fourth Education, Pearson 5th ed2013.
2. Charles H. Roth JR. Larry L. Kinney, Fundamentals of Logic Design, Cengaue learning 6th edition,2013.

Reference books

1. ZviKohavi,SwitchingandFiniteAutomataTheory,2ndEdition,TMH
2. Frederick J. Hill and Gerald R Peterson, Introduction to Switching theory and logic design, 3rdEdition, John Wileyandsons,1981.
3. Switching Theory and Logic Design by A. Anand Kumar, 2nd Edition, PHI Publishers.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

AC MACHINES LAB

Course Code: GR15A2044 L:0 T:0 P:2 C:2

Course Objectives: The Objectives of this course is to provide

- Basic knowledge of transformers.
- Basic knowledge of induction motors.
- Basic knowledge of alternators.
- Design a practical transformer.
- Knowledge about an induction generator.
- Concept of back to back connection of a transformer.
- Concept of three phase to two phase conversion by Scott connection.

Course Outcomes: At the end of the course, the student will be able to

- Have knowledge of various parts of a electrical machine.
- Calculate the parameters of equivalent circuit of single phase induction motor.
- Conduct open circuit/ short circuit test on transformer.
- Conduct experiments on Ac Machines to find the characteristics.
- Draw the various characteristics of three phase induction motor.
- Perform test on synchronous Machine to find Direct and quadrature axis reactance.
- Conduct No Load and Full load tests on transformers/Induction Motor

Contents

1. OC, SC and Load tests on single phase transformer.
2. Sumpner's test.
3. V and inverted V curves of a 3-phase synchronous motor.
4. 4.Brake test on slip ring induction motor.
5. No-load and block rotor tests on squirrel cage induction motor.
6. Equivalent circuit of single phase induction motor.
7. Determination of Xd and Xq of a salient pole synchronous machine from slip test.
8. Regulation of alternator by synchronous impedance method and MMF method.
9. Hysteresis loss determination.
10. Scott connection.
11. Induction generator.
12. Heat run test on transformer.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONTROL SYSTEMS LAB

Course Code: GR15A2045 L:0 T:0 P:2 C:2

Course Objectives: The Objectives of this course is to provide

- Knowledge on Electrical Softwares.
- Basic knowledge on practical control system applications.
- Knowledge on applications of machines & electronic devices with control systems.
- Basic concepts like Root-Locus, Bode Plot, Lead Lag, PID, etc.
- Concept of transfer function for different systems.
- Concepts in real time applications.
- Development of new experiments of various control concepts in lab.

Course Outcomes: At the end of the course, the student will be able to

- Have a strong knowledge of Electrical Softwares
- Do various engineering projects.
- Formulate transfer function for given control system problems.
- Find time response of given control system model.
- Plot Root Locus and Bode plots for given control system model
- Design Lead, Lag, Lead-Lag systems in control systems
- Design PID controllers for given control system model

Contents

1. Transfer function from zeros and poles and viceversa
2. Step response of a given transfer function
3. Ramp response of a given transfer function
4. Impulse response of a given transfer function
5. Root Locus from a Transfer function
6. Bode Plot from a Transfer function
7. Nyquist plot from a Transfer function
8. State Model from a Transfer function
9. Zeros and poles from state model.
10. Transfer functio of DC motor/Generator
11. Time Response of second order system.

12. DC Servomotor
13. PID Controller
14. Characteristics ofSynchros
15. Lag & Lead Compensator

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ANALOG AND DIGITAL ELECTRONICS LAB

Course Code: GR14A2046 L:0 T:0 P:2 C:2

Course Objectives: The Objectives of this course is to provide

- Concept of Operation Amplifier and 555 Timers.
- Classification of Analog I C's and Digital I C's
- Execution of the oscillators circuits, amplifiers circuits
- Concept of different types of waveform generators, clock pulse generation and digital logic implementation
- Knowledge on output waveforms and their functionality
- Knowledge on amplifiers, waveform generators and simple logic circuits
- Knowledge on analog computer and counters

Course Outcomes: At the end of the course, the student will be able to

- Recall the working operation of Operational Amplifiers, 555 Timer and their applications
- Compare the Digital and Analog IC's
- Practice the amplifiers, waveform generators and oscillator circuits
- Differentiate the integrators and differentiators working operation
- Judge the different waveforms and their applications
- Predict the circuit output waveform and its value.
- Construct the Digital Logic Function and analog circuits.

Contents

1. Design of Operational Amplifier as proportional Amplifier
2. Design of Operational Amplifier as integrator
3. Design of Operational Amplifier as differential amplifier
4. Design of Operational Amplifier as summation amplifier
5. Design of Operational Amplifier for multiplying two time varying signals
6. Design of Operational Amplifier for generation of triangle wave
7. Design of Operational Amplifier for generation of Square
8. Design of Operational Amplifier for generation of sin wave
9. 555 timer as basic application of generating train of pulses
10. 555 timer as speed sensor / frequency to Voltage Converter
11. Design of Operational Amplifier as D/A converter
12. Design of Operational Amplifier as V/f to F/v converter
13. All gates using Xilinx software with Verilog code
14. 7800 series & I C's and their applications
15. Combination circuits
16. Multiplexer and De multiplexer
17. Flip Flops implementation using Xilinx Software
18. Introduction to logic gates using Xilinx in Cool runner CPLD board

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE EDUCATION AND ETHICS

Course Code: GR15A2002 L:2 T:0 P:0 C:0

Prerequisites: General awareness on Moral Science

Course Objectives: The objective of this course is to provide

- Define and classify values, ethics
- Explain about self analysis, importance of values
- Organise constructive thinking and team work to create mutual happiness and prosperity
- Elaborate on ethics and professional ethics using case studies.
- Importance of continuous learning, choosing right work and career.

Course Outcomes: At the end of the course, the student will be able to

- Choose the right value system by self analysis and right understanding
- Make use of positive thinking, dignity of labour for building harmony and peace in self, family and society
- Analysing the importance of personality on effective behavior
- Identify and solve ethical dilemmas by finding value based and sustainable solutions in professional life.
- Find sustainable technological solutions for saving environment
- Compile value and ethical systems for continuous happiness and prosperity
- Take part in effective team work bringing out win-win solutions for complex problems

Unit-I

Values and self development –social values and individual attitudes, Work ethics, Indian vision of Moral and non-moral valuation, Standards and principles, Value judgments. Importance of cultivation of values, Sense of duty, Devotion, Self reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

Unit-II

Personality and Behavior Development-Soul and scientific attitude, God and scientific attitude, Positive thinking, Integrity and discipline, Punctuality, Love and Kindness, Avoiding fault finding, Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self destructive habits, Association and cooperation, Doing best, Saving nature.

Unit-III

Character and Competence-Science Vs God, Holy books Vs blind faith, Self management and good health, Equality, Nonviolence, Humanity, Role of women,
All religions and same message, Mind your mind, Self control, Honesty, Studying effectively.

Unit-IV

Professional consciousness Ethics: Ethical Human conduct, Development of human consciousness, Implications of value based living, Holistic technologies, Production systems, Universal human order, Code of conduct.

Unit-V

Legislative procedures: Rights and Rules, Human Rights, Valuable groups, Copy rights, IPR, RTI Act, Lokpal, Ombudsman.

Text Books

1. Chakraborty,S.K., Values and Ethics for Originations Theory and Practice, Oxford University Press, New Delhi, 2001
2. R R Gaur, R Saugal, G P Bagaria, "A foundation course in Human values and Professional Ethics", Excel books, New Delhi, 2010.

Reference Books

1. Frankena, W.K., Ethics, Prentice Hall of India, New Delhi, 1990.
2. Kapoor, S.K., Human rights under International Law and Indian Law, Prentice Hall of India, New Delhi, 2002.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

GENDER SENSITIZATION

Course Code: GR15A2106 L:0 T:0 P:3 C:2

Course Objectives

- To develop students sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes: At the end of the course, the student will be able to

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit-I

UNDERSTANDING GENDER: Gender: Why should we study it? (Towards a world of Equals: Unit – 1) Socialization: Making women, making men (Towards a World of Equals: Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities. Just Relationships: Being Together and Equals (Towards a World of Equals: Unit – 12) Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Further Reading: Rosa Parks – The Brave Heart.

Unit-II

GENDER AND BIOLOGY: Missing Women: Sex Selection and its Consequences (Towards a World of Equals: Unit – 4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit – 10) Two or Many? Struggles with Discrimination.Additional Reading: Our Bodies, Our Health (Towards a World of Equals: Unit – 13)

Unit-III

GENDER AND LABOUR: Housework: the Invisible Labour(Towards a World of Equals: Unit – 3) "My Mother doesn`t Work". "Share the Load". Women`s Work: Its Politics and Economics (Towards a World of Equals: Unit – 7) Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

Unit-IV

ISSUES OF VIOLENCE: Sexual Harassment: Say No! (Towards a World of Equals: Unit – 6) Sexual Harassment, not Eve – teasing – Coping with Everyday Harassment – Further Reading: "Chupulu" Domestic Violence: Speaking Out (Towards a World of Equals: Unit – 8) Is Home a Safe Place? – When Women Unite [Film]. Rebuilding Lives. Further Reading. New Forums for justice. Thinking about Sexual Violence (Towards a World of Equals: Unit – 11) Blaming the Victim – "! Fought for my Life ……" – Further Reading. The Caste Face of Violence.

Unit-V

GENDER STUDIES: Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit – 5) Point of View. Gender and the Structure of Knowledge. Further Reading. Unacknowledged Women Artists of Telangana.Whose History? Questions for Historians and Others (Towards a World of Equals: Unit – 9) Reclaiming a Past. Writing other Histories. Fur**,** her Reading. Missing Pages from Telangana History.

Text Books

1. Towards a World of Equals: A Bilingual Textbook on Gender" Telugu Akademi, Hyderabad Written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu.

Reference Books

1. Sen, Amartya. "More than Once Million Women are Missing". New York Review of Books 37.20 (20 December 1990). Print. `We Were Making History……' Life Stories of Women in the Telangana People`s Struggle. New Delhi : Kali for Women, 1989.
2. TriptiLahiri. "By the Numbers: Where India Women Work." Women`s Studies Journal (14 November 2012) Available online at: http://blogs. Wsj.com/India real time/2012/11/14/by – the –numbers – where- Indian- women-works
3. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada http://harpercollints.co.in/BookDetail.asp?Book Code=3732

4. Vimala “Vantilu (The Kitchen)”. Omen Writing in India: 600BC to the Present, Volume II The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.
5. Shatrughna, Veena et al. Women`s Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, India Council of Medcial Research 1993. B.Tech (ANE) R-15 Malla Reddy College of Engineering and Technology (MRCET) 113
6. Stress Shakti Sanghatana. “We Were Making History….’Life Stories of Women in the Telangana People`s Struggle. New Delhi:Kali of Women, 1989.
7. Menon, Nivedita. Seeing Like a Feminist. New Delhi. Zubaan-Penguin Books, 2012.
8. Jayaprabha, A. “Chupulu (Stares)”. Women Writing in India: 600BC to the Present. Volume II: The 20th Century Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
9. Javeed, Shayam and AnupamManuhaar. “Women and Wage Discrimination in India: A Critical Analysis”. International Journal of Humanilities and Social Science Invention 2, 4(2013).
10. Gautam, Liela and Gita Ramaswamy. “A ‘Conversation’ between a Daughter and Mother”. Broadsheel on Contemporany Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed.Madhumeeta Sinha and Asma Rasheed. Hydrabad: Anveshi research Center for Women`s Studies, 2014.
11. Abdulali Sohaila. “ I Fought For My Life…and Won.” Available online at: http://www.thealternative. In/lifestyle/i-fought-for-my lifeand-won-sohaila-abdulal/
12. Jeganathan Pradeep, Partha Chatterjee (Ed). “Community, Gender and Violence Subaltern Studies XI”. Permanent Block and Ravi Dayal Publishers, New Delhi, 2000
13. K. Kapadia. The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India. London: Zed Books, 2002.
14. S. Benhabib. Situating the self: Gender, Community, and Postmodernism in Contemporary Ethics, London: Routledge, 1992.
15. Virginia Woolf A Room of One`s Oxford: Black Swan. 1992.
16. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a Human Face